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National desktop review of bushfire building regulations

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Forest & Wood Products Australia

National desktop review of bushfire building regulations

Prepared for

Forest & Wood Products Australia

by

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National desktop review of bushfire building regulations

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1 EXECUTIVE SUMMARY

The on-going crises of the 2019-20 bushfire 'season' continue at time of this research (research to late 2019). For the first time, bushfires commenced mid-year in Queensland including within rainforest, before record drought and heat produced the most widespread and intense bushfires recorded across NSW, Victoria and Kangaroo Island (South Australia). Savannah fires burnt across northern Australia (Western Australia, Northern Territory and Queensland), transport links between the east and West Australia were cut by fires, whilst Tasmania suffered un-precedented fires earlier (January 2019) including through the Tasmanian Wilderness World Heritage Area.

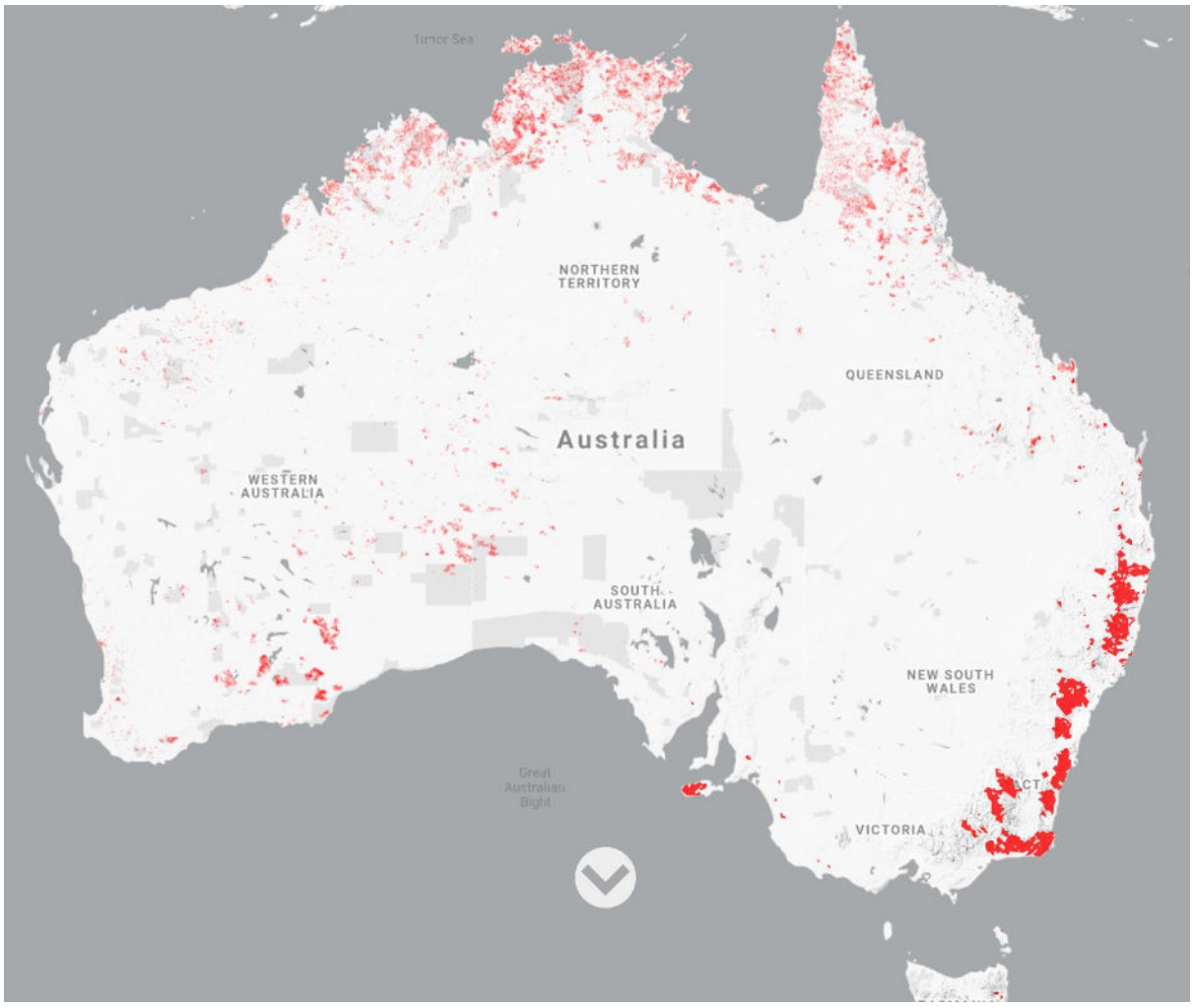

Figure 1.1: Map showing recent bushfire activity across Australia (The Guardian Australia, 11 February 2020)

This 'desk-top' research report briefly analyses each state and territory jurisdiction as a snapshot of the current application of bushfire and building planning and construction requirements.

Key findings are:

- There is no national agreement on how best to regulate for better building bushfire safety – be that in policy, regulation, application or advice, as each jurisdiction responds differently to their own regulatory and political imperatives.
- In consequence, regulatory practices vary widely across the spectrum of emergency response, planning approvals, construction requirements, from site assessments through to permissible construction materials.

- The 'Classes' of buildings captured by bushfire regulations vary from the baseline residential (through application of *AS 3959* from the *National Construction Code*) through to an increasing range of building types and uses in bushfire prone areas, restricting subdivisions to lower BAL's & assessing master-planning. There is no consistency in regulatory capture across jurisdictions.

- Following these bushfires, a new round of State (Victoria, NSW) and Federal (Royal Commission) bushfire enquires have been announced, which will doubtless lead to pressure for further bushfire re/building safety, through enhanced bushfire building regulations – be that through review of the NCC, *AS 3959*, *AS 5414* and/or bushfire shelters – as well as state-based planning and emergency services reviews.

- Regarding timber usage within bushfire prone areas, all jurisdictions are now applying restrictions on *external use* (cladding, decking, window/door frames, etc) for classifications greater than BAL-29. NSW has particularly onerous restrictions through adding 'flaming' to the AS 1530.8 series of fire-test requirements. Hence timber products that have passed the standardised fire test (BAL-40 and BAL-FZ) may still not be accepted within NSW by the *Rural Fire Service* (who's 'advice' to local government is rarely challenged).

- There appears to be no differentiation in timber usage across the jurisdictions with regards to the application of Appendix E of *AS 3959-2018* (*Timber Species and Densities*). That is the 55 named hardwood species with density of 750 kg/m3 (Table E1) compared to the 69 named hardwood species (Table E2) with lesser density of 650 kg/m3.

- There is no regulatory impact upon the full use of timber species and products *internally* to all Classes of building and uses, when within a bushfire prone area.

2 CONTENTS

3 PREFACE

At a time of severe early spring/summer bushfire activity across much of Australia in 2019, the *Forest & Wood Products Australia Ltd.* has a natural interest in better understanding the opportunities and constraints this may afford to the timber industry about the ever-tightening bushfire regulations that affect construction. Whilst there are some nationally applicable documents – notably the *National Construction Code – NCC* (which incorporates the *Building Code of Australia – BCA* – with two volumes applicable) plus *AS 3959 Construction of buildings in bushfire prone areas* it is apparent that the states and territories are being increasingly selective with their choice of bushfire regulations and their implementation.

Some jurisdictions assess bushfire and building matters as part of emergency and land management; others as urban/rural planning controls; whilst others leave the issue entirely to building and construction regulations. Policy objectives vary markedly, with no consistent approach across Australia, nor apparent interest in national harmonisation.

This short desktop review is designed to elicit key research insights into the current regulatory 'state of play' around Australia in **late 2019** – made harder because so much is in flux – with the most widespread and intense bushfires on record continuing across much of Australia. More specifically, the ambitious stated project goals (within established time limits) are:

1. Assess the current bushfire regulations across state and territory jurisdictions (that may affect timber usage).
2. Outline primary/secondary approval bodies and approval mechanisms across all jurisdictions (ie, planning, building, emergency services.,
3. Outline state and territory regulatory approaches, priorities, and/or differences regarding the use of AS 3959, NASH standard, or other such mechanisms.
4. Where relevant (and possible) provide jurisdictional insights into local government approaches to bushfire regulations and bushfire mitigation.
5. Identify barriers to timber usage within bushfire prone areas across jurisdictions.
6. Record key bushfire information sources and references across jurisdictions.

4 METHODOLOGY

On-line, each jurisdiction presents various reports, studies, legislation, codes, information bulletins and general bushfire advice under key words (most typically starting with 'bushfire regulations /controls'). Whilst there is a wealth of such information online, scanning, sieving and pursuing issues for current applicability is not easy, as many previous and now outdated documents clutter the web – with too many without a date(!). Even terms 'common' to bushfire regulations have state/territory variations in meaning and legislative consequence.

Hence it became necessary to pursue matters across legislation and agencies from the fields of emergency management, bushfire/government agencies, town/urban planning, plus construction/building fields in each jurisdiction. This is before attempting to verify findings with key agencies and practitioners within each jurisdiction. With ever-changing bushfire regulations (even as this report was researched), it should be recognised that this report represents a 'snapshot' of regulations and interpretations as of late 2019. It will be changing through 2020 and onwards as no doubt the current massive bushfires in multiple states spurs more enquiries, more calls for government/agency action, and further mandated bushfire regulations. Many people across state and territory jurisdictions demand safety and certainty – which is exactly what bushfire regulations and controls cannot provide.

Key references and acknowledgements of those who have assisted are listed by each jurisdiction. Ultimately, responsibility for this report rests with Nigel Bell of *ECOdesign Architects + Consultants.*

5 NATIONAL BUSHFIRE REGULATIONS

5.1 Bushfire regulation & compliance

There is no national approach to bushfire matters. Each state and territory is entitled to pursue and legislate as they see fit, currently, with no national alignment or coordination. Bushfire objectives, planning, policies, performance requirements and even *Deemed-to-Satisfy* ('*DTS*' – a term meaning 'everyday' specified construction solutions) therefore vary enormously – lacking a national approach (as highlighted by the *Fire Protection Association of Australia (FPAA)* in 2019 bushfire conference, Wyborn, 2019).

The only national (and limited) regulations around bushfire issues are contained within the *National Construction Code (NCC)* which incorporates the *Building Code of Australia (BCA).* Current edition is the *NCC 2019*. Code revisions generally occur once every three years (with a current exception of upgrading fire-resistant cladding requirements). State and territory legislation provide legal power and administrative arrangements for the adoption of the *NCC*, plus State and Territory Variations (discussed below) that include differing bushfire requirements from the *National Construction Code*. Most relevant is the predominantly domestic construction (Class 1 and 10) within Volume Two which is called up across Australia, whilst only some jurisdictions refer to a greater variety of building uses/classes as requiring a bushfire response (ie. within NCC Volume One).

- **Volume One: Class 2 to 9 buildings** (being the full range of commercial, industrial and public-access building types and uses).
- **Volume Two: Class 1 and 10 buildings** (houses, sheds, carports, including Class 10c being a *private bushfire shelter*, etc).
- Volume Three: (not relevant to this discussion) Plumbing Code of Australia

Relevant bushfire standards and codes: * called up within the NCC as '*Deemed-To-Satisfy*'.

* *AS 3959-2018 Construction of buildings in bushfire-prone areas*.

* *NASH Standard (2014) Steel Framed Construction in Bushfire Areas.*

AS 5414 – 2012 Bushfire water spray system.

ABCB (2014) Performance Standard: private bushfire shelters.

NOTE: Where reference is made within this report to *AS 3959-2018,* The *NASH* (light-gauge steel) *Standard* may also be used – except where specifically excluded.

5.2 Residential Class 1 & 10 (Volume Two): *Deemed-to-Satisfy (DTS)* + state variations

The relevant *Deemed-to-Satisfy* (*DTS*) provisions of Volume Two Housing) are found in *Part 3.10.5 Construction in bushfire areas*. This contains little text other than stating a Class 1 or Class 10a building or deck associated with a Class 1dwelling located within a designated bushfire prone area to be of acceptable construction if built in accordance with *AS 3959* or *the NASH Standard – Steel Framed Construction in Bushfire Area*.

NSW Variations: *Part 3.10.5.0* is replaced by amending NCC requirements for BAL-FZ (both *AS 3959* and the *NASH Standard*) to the requirements of the NSW Rural Fire Service *'Planning for Bushfire Protection'.*

Queensland Variations: *Part 3.10.5.0* is amended when the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types, mangrove communities and grasslands under 300 mm high). [The later Section 9 on Queensland requirements will indicate that further regulatory differences from *AS 3959* are in play, in responding to the greater vegetation diversity across that state.]

5.3 *Alternative solutions + Verification Methods*

An *Alternative Solution* submission based upon *Performance Requirements* may be made in lieu of the *Deemed-To-Satisfy* requirements of the National Construction Code, if it complies with the applicable *Performance Requirements* for that Section or Part. Four options for the assessment method are offered alone, or in combination. Importantly, the *Australian Building Codes Board* has released a 'Bushfire Verification Method' handbook (March 2019) that provides the criteria for demonstrating compliance with NCC bushfire requirements. https://www.abcb.gov.au/Resources/Publications/Education-Training/bushfire-verification-method). This document is highly relevant to practitioners seeking to demonstrate compliance within bushfire-prone areas using Verification Methods GV5 or V2.7.2 (see below). It is also useful for those that are seeking a greater understanding of bushfire modelling, test methods and administration.

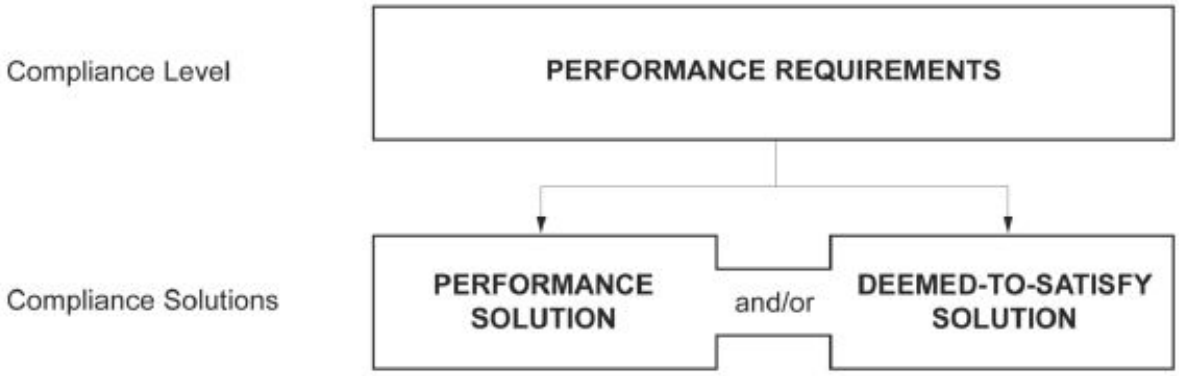

Figure 5.1: NCC compliance options (Source: NCC 2019, A2.1)

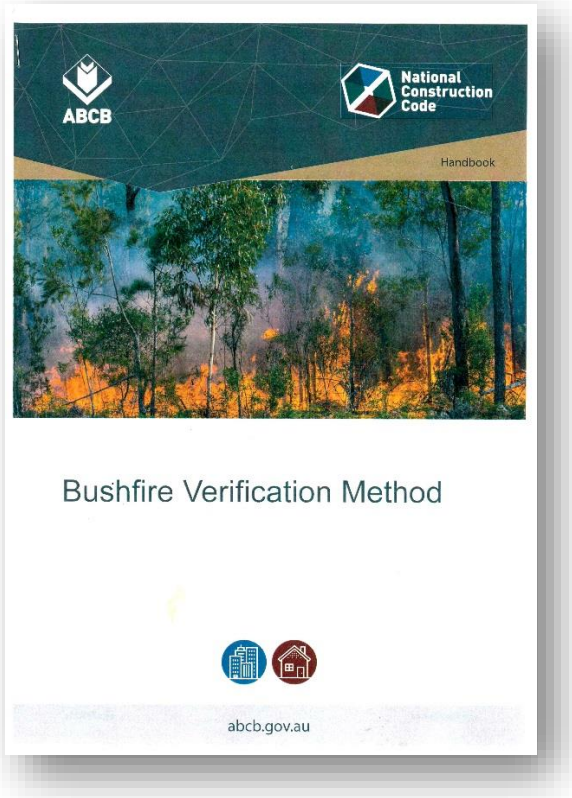

Figure 5.2: Bushfire Verification Method (2019)

5.4 Volume One (Class, 2 to 9 buildings): *Deemed-To-Satisfy (DtS)* + state variations

The *NCC Volume One, Part G5 Construction of buildings in bushfire prone areas* applies purely to Class 2 or Class 3 buildings (broadly Class 2 multi-residential buildings, and Class 3 transient residential uses) or associated Class 10a building within designated bushfire-prone areas. Thus multi-unit dwellings, offices, shops, schools and the like are currently excluded from national (NCC) requirements - but *are* called up in some State Variations (see below), plus in some cases through State planning legislation.

***Part G5 Construction in bushfire prone** areas* contains the following short sections:

- **Objectives:** (a) to safeguard occupants from injury, and (b) protect buildings within a Class 2 or 3 building, or Class 10a building or deck (that is, dual-occupancies, motels, guest houses, boarding houses, backpackers, residential portions of hotels/schools/health-care buildings/detention centres, accommodation for the aged children or people with disabilities).

- **Functional Statements: GF5.1** This requires a resistance to bushfires in order to reduce the danger to life and to minimise the loss of the building, applying to NSW, Tasmania and Queensland (only).

- **Performance requirements: GP5.1** This states that 'to the degree necessary' buildings must be designed and constructed to reduce the risk of ignition caused by burning embers, radiant heat or flame, appropriate to the intensity of the bushfire attack.

5.5 NCC Summary

National bushfire controls thus apply in a limited way to construction standards only, through the *BCA/NCC*. Residential housing (Class 1) and associated Class 10 buildings (garages, carports, sheds, bushfire shelters) must only meet *AS 3959 Construction of buildings in bushfire-prone areas* for bushfire construction compliance (with NSW and Queensland exceptions).

Other Classes of buildings – *if* states/territories mandate they must comply – they must then meet Part G5 of the *BCA/NCC*. However, those jurisdictions that do have bushfire controls for other multi-residential buildings, shops, offices, factories, public/assembly buildings (meaning other 'Classes' of buildings as defined by the *BCA/NCC*) then primarily use planning controls for regulatory compliance – as discussed in later Sections.

6 AUSTRALIAN CAPITAL TERRITORY

Being inland, the ACT has a largely continental climate with hot summers and cold winters yet four distinct seasons. Rainfall is spread throughout the year, although summer thunderstorms are common. Vegetation is mainly to the west and south of Canberra, including extensive pine forest plantations contiguous with that adjacent in NSW. With around half the territory being a nature reserve, land and forest management for emergencies has become important. Severe summer bushfires have occurred (ie. 1939, 1952, 1979, 1983, 2003 and 2019/20) with the 2003 Canberra fires causing four deaths, the loss of 487 homes and with 70% of the ACT fire affected. The 2019 bushfire season was brought forward one month (1 September) and lengthened one month (end of April 2020) due to the challenging weather conditions.

The *ACT Rural Fire Service* is a division of the *ACT Emergency Services Agency*. The RFS has around 450 volunteers registered across eight rural brigades, plus headquarters coordinating staff. The ACT shares the same FDI as NSW adjacent – FDI 100 – and has deliberately sought to harmonise their bushfire planning and responses to those of the *NSW Rural Fire Service*.

6.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

The ACT is unique in Australia in being both Territory and local government in one. Having suffered devastating bushfires in January 2003 (4 deaths, 487 houses lost, 70% of the ACT affected), it has developed agencies, policies and practices focussed on bushfire matters across the Territory. A specific aim has been to harmonise practices with the NSW *Rural Fire Service* requirements. At time of writing a new planning regime was being introduced – the *Strategic Bushfire Management Plan 2019-2024* (*SBMP*) which will transcend much of the previous requirements set out in the Territory's *Planning for Bushfire Risk Mitigation General Code* (March 2008).

Table 6.1: The relevant ACT bushfire regulatory agencies.

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS regarding bushfire
ACT *Emergency Services Agency* (ESA) • ACT Fire & Rescue (ACTF&R) – paid fire-fighters • ACT Rural Fire Service (ACTRFS) - volunteers	***The Emergencies Act 2004*** ***ESA Strategic Bushfire Management Plan***
ACT *Planning & Land Authority* (P&LA)	***Planning & Development Act 2007 (P&D Act)*** ***Territory Plan 2008*:** Especially Section 11.11 *Planning for Bushfire Risk Mitigation General Code* (March 2008) *Planning and Development Regulation 2008* (1 October 2019) Chapter 9. Bushfire emergency rebuilding. ***ACT Planning Strategy 2018*** ***Strategic Bushfire Management Plan 2019-2024*** (*SBMP*)
ACT *Environment Protection Authority* (EPA)	
ACT *Parks and Conservation Service* - land managers with responsibility for Bushfire Operations Plans, prescribed burns, and a Fire Management Unit.	***Nature Conservation Act, 2014***

6.2 LEGISLATIVE REQUIREMENTS

The ACT planning and development processes arise from the *Territory Plan 2007* in conjunction with the *Building Act 2004,* both of which are being reviewed. The Territory's planning and development regime is based on the concept that bushfire protection is a shared responsibility between the ACT Government, landholders and the public. They provide a hierarchy of strategic, operational and tactical plans and maps that prescribes the ACT's planning and development requirements. *The Planning and Development Act* establishes the *Territory Plan*. The *Territory Plan* is the key statutory planning document in the ACT and defines the administration of planning which now considers bushfire risk at all levels of planning, particularly for urban edges susceptible to bushfires and new urban development. This new bushfire planning regime will call up *AS 3959* and BAL ratings for all bushfire prone areas, which until now had only been mandated for the non-urban areas. Much of the ACT planning policies and practices are intended to be compatible with NSW requirements as established by the RFS *Planning for Bushfire Protection*.

6.2.1 Building classifications requiring bushfire protections

Within the ACT, standard *BCA/NCC* bushfire requirements apply, meaning residential and accommodation buildings only. Bushfire requirements do not currently apply to non-residential buildings or non-habitable buildings or other structures on residential land. Due to the distinctive Canberra land-use pattern with government agency controls over maintenance of adjacent land, there are few properties that would become assessed as *BAL-40* or *BAL-FZ*.

6.2.2 Defining bushfire prone area requirements

All areas of the ACT outside the defined urban area have until recently been designated bushfire prone – thereby calling up provisions of *BCA/NCC* and *AS 3959* – whether bushland or agricultural land. However, the new online bushfire mapping (see below) has formally triggered and widened the designated *Bushfire Prone Area (BPA)* to include the urban edges most vulnerable to bushfire attack. Hence (for the first time) development conformity with *AS 3959* will be required within all designated bushfire prone areas.

6.2.3 Determining BAL ratings

The ACT government has previously provided Advisory Note 1601 and maps that illustrates the Bushfire Attack level (BAL) at street level within area *Precinct Map and Code,* thereby largely negating the need for individual project bushfire assessments commonly required in other jurisdictions. The exception is proposals within the designated Bushfire prone areas (rural lands) where a BAL-rating is not provided, and/or projects where due to particular site factors a bushfire consultant may be able to successfully argue a different BAL-rating.

This has now been taken further with assessments via LIDAR, giving property by property BAL ratings with 'AutoBAL' ratings about to become available online (see Figure 1 below).

6.2.4 Bushfire strategies for new urban areas

The *Emergency Services Authority* remains the principal agency for providing strategic advice to government and developers about bushfire risk. It is the referral authority for independent, site-specific risk assessment for new estate developments, non-residential buildings and fire-related matters under the Building Act 2004. The design and layout of new subdivisions and developments must reduce the bushfire vulnerability of dwellings and residents. New greenfield estates must provide that all residential blocks must not face a greater risk than BAL-29. As a standard approach, any intensively managed Inner *Asset Protection Zones* required to achieve that level must be located within the footprint of the area to be developed.

Facilities associated with people more vulnerable to bushfires are not generally permitted in the *Bushfire Prone Areas* (*BPA*) without specific agreement by the ESA Commissioner – including schools, hospitals, nursing homes, supportive housing, aged care facilities, retirement villages, childcare centres and tourist

accommodation. We are informed that development must also satisfy revised bushfire risk mitigation planning controls proposed to be introduced as part of the forthcoming review of the *Territory Plan*.

6.3 ACT BUSHFIRE MAPPING and FIRE ZONES

The new ACT *Strategic Bushfire Management Plan 1919-2024 (SBMP) V*ersion 4 provides overall direction for bushfire management with implications for all land managers and owners. This has been made accessible through online mapping with an App that allows for property searches across the territory. It also states that "..from late 2019.."all new homes and substantial renovations (+50% of building volume) identified by the mapping as being bushfire prone must conform to the relevant section of *AS 3959*, whether greenfield or an established suburb (p. 26). 'Sensitive-use' developments and facilities are to be controlled - requiring the ESA Commissioner to be satisfied that it is appropriate in minimising risk to persons. They must also be consistent with the bushfire mitigation requirements to be developed as part of the revised Territory Plan (not yet available).

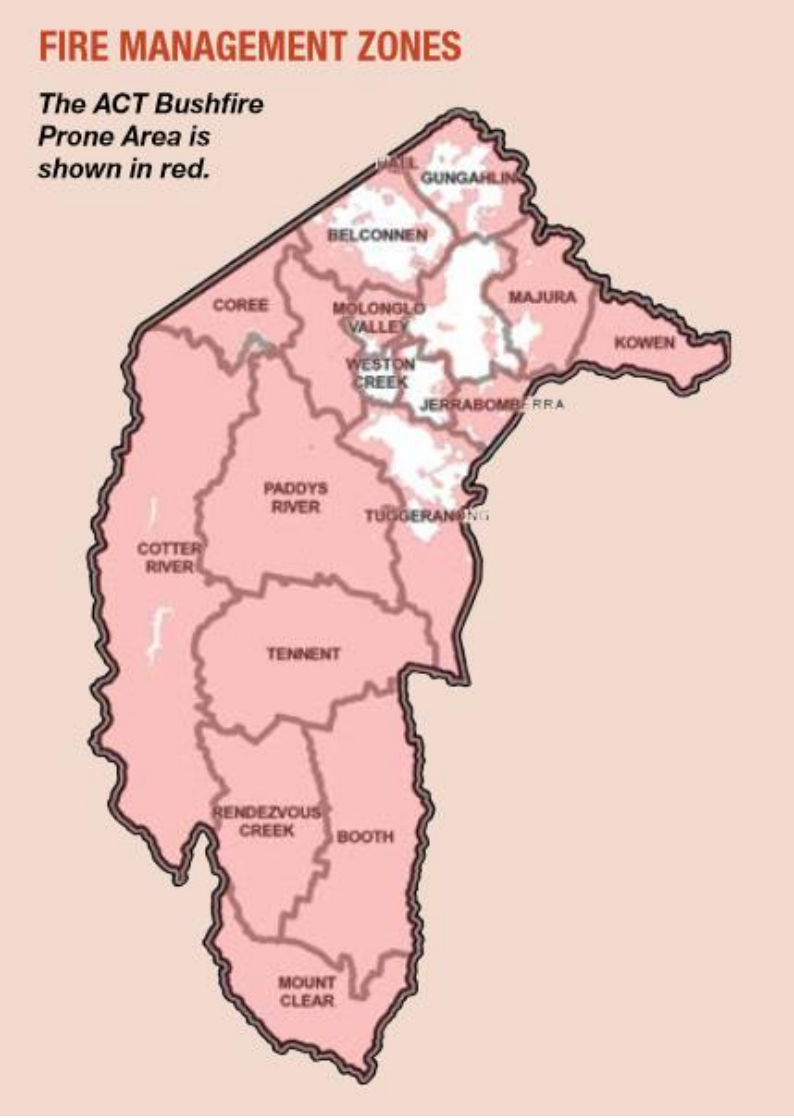

Figure 6.1: ACT bushfire prone area map exempting the urban areas (SBMP, p.16)

6.3.1 *Bushfire Prone Area* (*BPA*)

This online map defines the rural and built-up 'edge' land and properties (typically within 100 metres of bushland) that that is at high bushfire risk – to assist persons in developing a Bushfire Survival Plan as part of broader community education and awareness. The mandatory application of AS 3959 currently only applies within non-urban lands, but change is likely with the current review. There is a general bushfire protection requirement (Element 14.4, *Residential Zones Development Code*) that such buildings must conform to BCA/NCC requirements (meaning residential construction Class 1 to 4 only).

6.3.2 *Bushfire Abatement Zone* (*BAZ*)

Under the *Emergencies Act* the Commissioner has declared an area around Canberra where specific measures are required to reduce the bushfire risk to the urban areas from largely rural and bushland areas within the BAZ. Measures include land-use constraints, land management requirements for private and government land ownership, and pre-incident bushfire planning.

The Bushfire Abatement Zone (area in purple).

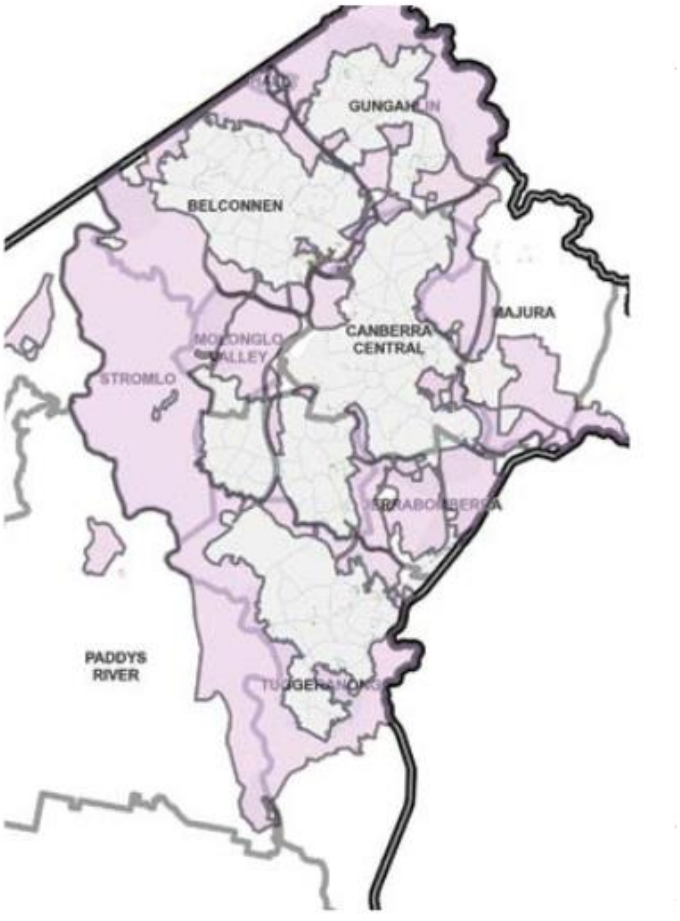

Figure 6.2: Bushfire Abatement Zone around the urban areas (SBMP, p.18)

6.3.3 Bushfire Operations Plan (*BOP*)

This details the specific bushfire mitigation requirements for landholders to reduce the spread of a fire into urban areas. The online map shows (only) the current BOP prepared by the Territories *Environment, Planning and Sustainable Development Directorate (EPSDD)* based on their five-year *Regional Fire Management Plan.*

6.3.4 *Regional Fire Management Plans* (*RFMP*)

This planning document details the five-year program of work for fuel reduction, access and infrastructure as approved by the ACT Emergency Services Commissioner.

6.3.5 *Fire Management Zones* (*FMZ*)

The Fire Management Zones are areas within the *Bushfire Prone Areas* that have been identified as priority areas for fuel management and access for fire agencies. A Fire Management Zone may be composed of sub-zones such as Asset Protection Zones, Strategic Firefighting Advantage Zones, Agricultural Fire Management Zone, Land Management Zones, Landscape Management Zone and Rural Land Management Zones - all to minimise the risk in new greenfield estates and elsewhere. The online mapping that illustrates these FMZ zones are indicative only at the scale presented.

6.4 GUIDELINES

6.4.1 ACT *Bushfire Management Standards*

These will describe the specific design and planning requirements including Asset protection zones, access/egress roads and emergency vehicle turning circles. The standards will also describe the ACT emergency and evacuation requirements, especially for those within sensitive use developments. Water requirements for fire response operations will also be covered. Fuel-management audits and access within *Asset Protection Zones* (APZ) or under a *Bushfire Operations Plan* (BOP) will be included.

6.4.2 Urban vegetation guidelines

Guidelines and advice on how to increase building resilience are proposed to be developed, consistent with government targets to retain tree canopy (in recognition of global warming and the 'heat-island' effect within urban areas).

6.5 TIMBER CONSIDERATIONS

There are no special requirements or limitations on timber usage other than for those called up by the *BCA/NCC*, effectively meaning compliance with *AS 3959* requirements.

6.6 ACT SUMMARY

The regulatory changes (from late 2019) tighten the ACT bushfire planning and construction regimes quite markedly, with further changes under consideration. The ACT legislative framework including the *Planning & Development Act*, *ACT Planning Strategy 2018*, *Territory Plan* and bushfire-specific planning and construction requirements (ie. *AS 3959*) plus coordination with NSW practices (through the RFS *Planning for Bushfire Protection)* indicate a more rigorous response to bushfire hazard and risk than previously. New residential developments on the urban/bushland fringe will be required to have sealed roads, water infrastructure, emergency service vehicle planning as well as Asset Protection Zones. With bushfire risk mitigation controls being introduced as part of the revised *Territory Plan*, subdivisions, new development and 'sensitive use developments' are to be actively discouraged around the (well-defined) urban/bushland edge.

Effectively, BAL-29 will become the highest risk factor for new residential development and "..substantial alterations and additions..". All other Classes of buildings that house vulnerable people ('sensitive use developments') including hospitals, schools, child-care, aged care , retirement villages and tourism developments will have to justify their proposal through a rigorous assessment before possible acceptance by the Commissioner of the *Emergency Services Authority*. Whilst currently bushfire requirements apply to just residential properties under the *BCA/NCC* (calling up *AS 3959*).

6.7 TERMINOLOGY

Table 6.1: Terms specific to the ACT.

ACTmapi	ACT interactive mapping found at www.actmapi.act.gov.au
Bushfire Abatement Zone (BAZ)	A designated area rural and bushland area around Canberra where land-use constraints and hazard-reduction measures are designed to reduce bushfire risk to urban areas.
Bushfire Operations Plan (BOP)	Specific bushfire mitigation requirements for land-holders to reduce bushfire risk for urban areas.
Fire Management Zone (FMZ)	Mapped priority areas for fuel management and fire-fighting access adjacent to existing or proposed development.
Regional Fire Management Plan (RFMP)	The broader fuel-reduction, access and infrastructure five year management plan for the ACT.
Strategic Bushfire Management Plan (SBMP)	Version 4, being 2019 - 2024 of the five-year bushfire management plan for the ACT

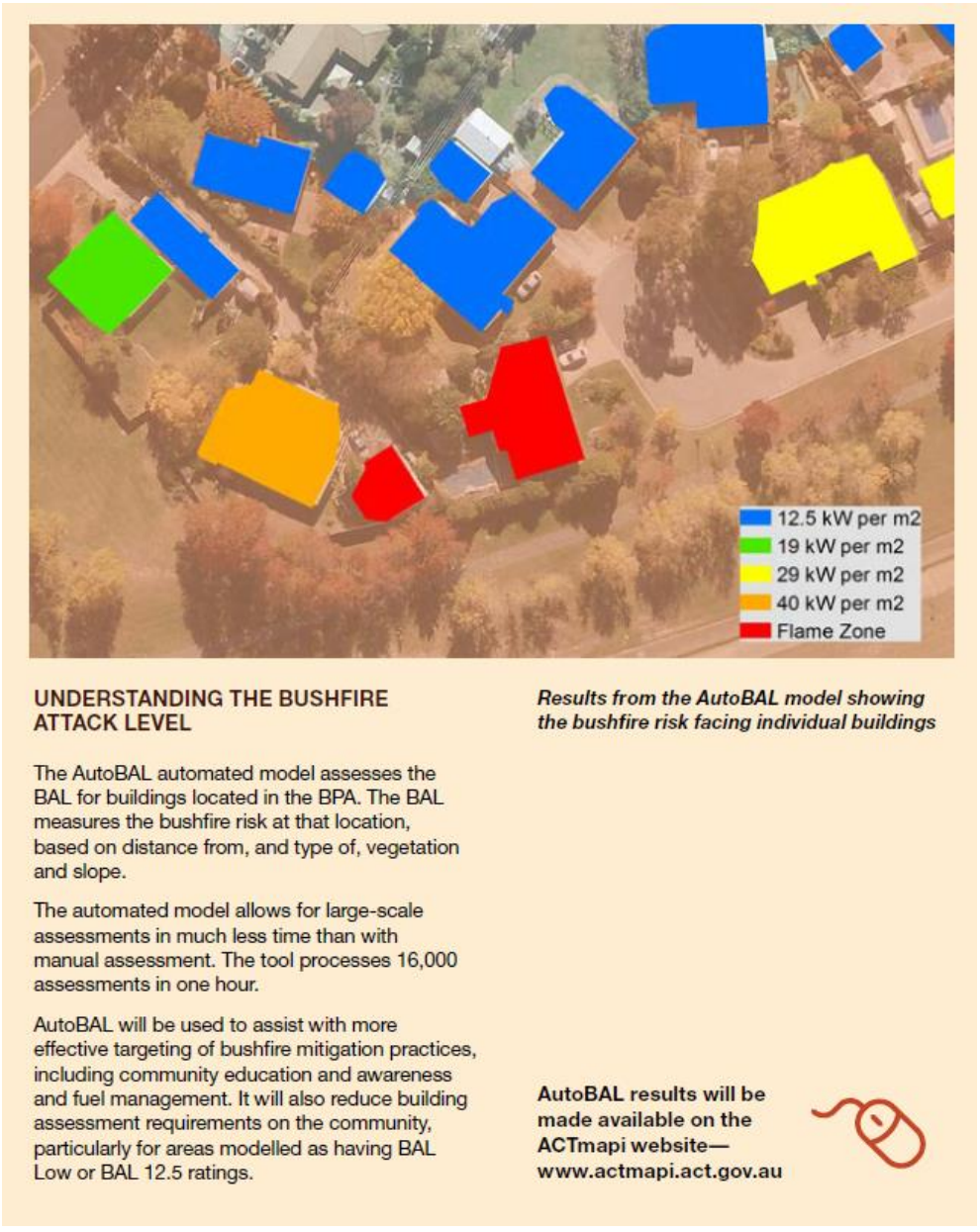

Figure 6.3: AutoBAL model for the ACT (SBMP, p.62)

6.8 REFERENCES

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6.9 ACKNOWLEDGEMENTS

Greg Potts, *ACT Rural Fire Service*, Manager, Community Bushfire Protection.

7 NEW SOUTH WALES

The NSW land mass is largely separated by the forested Great Dividing Range north-south, with dry and arid lands west and more populated towns and cities near the coast to the east. The heaviest rainfall is on the mountains and ranges nearest the coast, falling away markedly to the west of the state. Thus woodlands and forests (plus National Parks) dominate the bushfire environment, with Fire Danger Index of 100 for the Hunter, Sydney, Illawarra/Shoalhaven, far South Coast and Southern Ranges fire weather districts. The remainder of the state has a FDI 80, except for the NSW alpine areas with FDI 50. Around 63% of the NSW population lives in the broader Sydney region which has been subject to increasing frequency and severity of bushfires.

For over 100 years NSW volunteer fire-fighting efforts where coordinated by local government, until the Rural Fires Act 1997 provided the primary legislative backing for a more professional service. Funding continues from insurance companies (73%), state and local government sources. As the Service developed, it provided policies and practices that led to the first version of *Planning for Bushfire Protection* (2001). Following the 2003-04 bushfires, the NSW government elected to professionalise the largely volunteer *Rural Fire Service* (RFS), funding a large expansion of personnel and equipment across the state, whilst concentrating expertise within regional and Sydney headquarters. Currently the Service claims seventy-four thousand volunteers and 822 paid staff covering most of NSW, through 2,000 local brigades – although not all members are considered active. The RFS is a statutory body of the NSW Government and is a separate entity to the *NSW Fire & Rescue* (that mostly covers urban areas).

7.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

Table 7.1: The relevant NSW bushfire regulatory agencies.

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS
NSW Rural Fire Service (RFS) the predominantly volunteer fire service	***Environmental Planning & Assessment Act (1979)*** and the ***EP&A Regulation (2019)*** ***Rural Fires Act 1997***
NSW Fire & Rescue (FRNSW) the regular urban fire-brigade that is on stand-by to assist with bushfires and runs community education plus Fire Safety Units in bushland areas.	***Fire & Rescue NSW Act 1989*** ***Fire Brigades Regulation 2014***
State Emergency Services (SES) emergency volunteer assistance with flood, storm tsunami, plus occasionally bushfires	***State Emergency Services Act 1989***
O*ffice of Emergency Management* (NSW Department of Justice) emergency management, disaster assistance.	***State Emergency & Rescue Management Act 1989***

With recent gazettal of a new *Environmental Planning and Assessment Regulation (2019)* the November 2019 version of *Planning for Bush Fire Protection* now applies across NSW with a short transitional period of four months (to 1 March 2020).

The legislative powers of the *Rural Fire Service* include mandating compliance with *PBP* across NSW with referrals and verification undertaken through Local Government - usually at Development Application (town planning 'DA') stage. Up to BAL-29, local government is authorised to assess bushfire compliance (amongst all

other matters). If an application is thought to be greater than BAL-29, it must be referred to the *RFS* for assessment and determination (reportedly around 5,500 applications per annum). This split responsibility presents contradictions and compliance difficulties.

7.2 *PLANNING FOR BUSH FIRE PROTECTION 2019* (*PBP*)

PBP is the predominant bushfire policy and practice document for NSW – and mandated as a state variation to the *BCA/NCC*. **Importantly, the NSW State variation applies to Class 1, 2, 3, 4 and 9 and 10a buildings plus referral within bushfire prone areas for other types and uses of buildings – drawing in a wider range of buildings at planning stage than elsewhere in Australia**. The regulatory intent of the revised *PBP* has been to incorporate the developing science and public information previously released intermittently as 'Fact Sheets' stating (changing) policy and planning requirements. The key matters addressed below follow the section layout of PBP.

7.2.1 Framework

PBP is applicable to all bushfire prone land (BFPL) across the state – mapped by Council's and approved by the RFS (updated every 5 years). Applications for development within BFPL should include a bushfire assessment report that demonstrates it satisfies the requirements of PBP. There is no set minimum standard or training for assessment reports, but some Councils are only accepting bushfire reports from those accredited by the *Fire Protection Association of Australia* (FPAA) as BPAD – Level 1 (BAL Assessor), Level 2 (Bushfire Planning Practitioner – Prescriptive) or Level 3 (Bushfire Planning Practitioner – Performance). Certainly, the RFS expects any 'Alternative Solution' report and *Special Fire Protection Purpose* applications to be presented by a BPAD-trained Level 3 Practitioner (see FPAA website reference below).

Development Applications (DA's) can address the identified acceptable solutions within *PBP* (*Deemed to Satisfy - DTS*) or follow a performance-based solution (where there is now the ABCB '*Bushfire Verification Method*' to direct the required response). All building work must then conform for the relevant BAL rating to *AS 3959* – except within BAL-FZ (Flame Zone) – which is considered above and beyond prescribed bushfire safety measures.

Section 2.4 of the *NSW Environmental Planning and Assessment* (EP&A) *Act* states that *PBP* applies to all development on bushfire prone land, where it must meet the *PBP* Aims and Objectives and the *RFS* will determine which specific standards refer to that development(!). Other clauses of the EP&A Act (s.4.15) may also trigger referral to the RFS. New lots on Urban Release Areas (subdivisions) may benefit from a streamlined process of a post-subdivision BAL Certificate up to BAL-29. The 2019 *PBP* states (without explanation) that "..the role of strategic planning will be strengthened to ensure that new development is located in appropriate areas." It should be noted that 'exempt and complying development' (NSW legislation that permits simple 'everyday' development - without Development Approval) is not permitted in BAL-40 or BAL-FZ areas.

Section 2.5 states that in NSW the provisions apply to the following *BCA/NCC* Classes of buildings plus *Special Fire Protection Purpose* (*SFPP*) buildings – which is broader than other jurisdictions. That is:

- **Class 1**: Residential, including dwellings, attached residential buildings, boarding house, guest house, hostel, some holiday accommodation.
- **Class 2**: A building with two or more separate dwellings ('sole occupancy units').
- **Class 3**: Other residential buildings including residential parts of a hotel, motel, school, aged accommodation, children or people with disabilities, residential part of health care or a detention centre.
- **Class 4**: Residential parts of other building Classes.

- ***Special Fire Protection Purpose*** **buildings** that includes schools, hospitals, nursing homes and tourist accommodation – identified as vulnerable persons being more at-risk from bushfire effects – see later section.

Asset Protection Zones (*APZ*) meaning separation from un-managed bushland to reduce fuel loads are a fundamental premise of *PBP*, along with defendable space adjoining the building. ***PBP*** **sets minimum distances for APZ's, BAL and vegetation class tables (Table A1.12.) which are more onerous (and detailed) than AS 3959 requirements.** For example, the *PBP* tables used to determine the *Bushfire Attack Level* push NSW developments into higher BAL ratings than AS 3959 - as distances to classified vegetation are reduced from those of AS 3959. It remains to be seen how readily this is recognised by industry and community, along with the increased construction costs that follow.

7.2.2 New *Special Fire Protection Purposes (SFPP)*

This term covers building uses where occupants may be more vulnerable to bushfire attack (being 'Integrated development' that requires a 'Bushfire Safety Authority' (BFSA) approval.

SFPP buildings cross *BCA/NCC* Classes to include caravan parks, camping, bed and breakfast, farm-stays, holiday lets, ecotourism, manufactured home estates, home-based child-care, manufactured home estates, and the like.

Additional uses have been recently added to the *SFPP* categories due to evacuation challenges from the number of occupants:

- **Tertiary educational institutions** (eg. TAFE, universities) where emergency and evacuation planning is required.
- **'Places of public worship' and other 'public assembly structures'** (ie. community halls, sporting clubs, men's shed) where additionally, emergency management planning is required.

This new *PBP* edition removes home-based childcare and short-term holiday accommodation from *SFPP* listing as these uses are now captured by 'residential infill' requirements (see below). As manufactured home estates will not usually conform to AS 3959, the RFS requires an APZ to meet BAL-29 requirements for all accommodation with a performance-based solution. Similarly, eco-tourism emphasises emergency management, leaving early and closure on days of extreme or catastrophic weather. At least one building must act as a refuge onsite with vehicular access, built to BAL-12.5, and able to accommodate all occupants. Cabins must be within 100 metres of the refuge building.

Alterations or additions to an existing *SFPP* building within a bushfire prone area may require a large *APZ*, an assembly point, refuge, and/or retrofitting of existing buildings against embers or more. Again, procedures must be in place for emergency evacuation.

7.2.3 Infill residential development

All NSW residential development within bushfire prone areas have had to comply with *PBP* since 2002. This covers performance criteria and/or acceptable (*DTS*) solutions for access, water supplies, construction standards, landscaping and emergency management. The 2018 *PBP* requirements for sarking, sub-floor supports decks and verandas (upgrading lower BALs to minimum BAL-29 requirements) remain in advance of the national AS 3959 requirements. Within NSW, all un-enclosed construction for sub-floor (supports, bearers, joists including decking), decks, steps, ramps, landings and verandahs are required to be non-combustible, built from 'bushfire-resisting timbers' to Appendix F, or a combination of the two for all BALs up to and including BAL-29.

The NSW variation to the BCA/NCC specifically excludes *AS 3959* or the *NASH* standard as being an acceptable solution for BAL-Flame Zone. Hence a performance-based solution is required, supported by test system data (ie. *AS 1530.8.1* for BAL-40, and *AS 1530.8.2* for BAL-FZ). The NSW RFS exception to this allows for non-conforming "minor construction elements.." but requires no flaming of the material. The Fast Fact (2/17

of June 2017) mentions window frames (but not doors) as 'minor' that may be approved by the RFS – leaving the industry with much Approval uncertainty.

7.2.4 Other development (ie. multi-storey residential)

The RFS discourages any increase in residential density in bushfire prone land (BFPL) past BAL-29, including multi-dwelling housing, dual occupancy, secondary dwellings, boarding houses etc. Where approval is granted, this may include upgrading of any existing dwelling on the lot (ember protection, water availability, access, APZ).

Multi-storey residential buildings (ie. 3+ stories) are required to comply with the performance criteria set out in Section 5 of *PBP*, with further technical considerations outlined. It states that such developments will only be considered on BFPL if a fire engineering analysis can demonstrate the risk is acceptable.

Class 5 – 8 buildings (eg. offices, shops, factories, warehouses) are exempt from bushfire considerations by the BCA/NCC (*AS 3959* and *NASH* do not apply). However, *PBP* (cl. 8.3.1) states that access, water and services, emergency and evacuation planning will be considered on a case by case basis. Whether Council's should refer such developments to the RFS for 'Bushfire Safety Authority' (BFSA) approval is un-clear as there is no obvious legislated trigger. Nevertheless, it is expected that a wider range of buildings are likely to be required to fully address the range of 'Bushfire Protection Measures' (BPM).

Class 10 structures (eg. private garage, carport, shed, or private bushfire shelter have no bushfire protection measures when located 6 metres or more from a dwelling – but if closer – it must be constructed in accordance with *BCA/NCC* requirements. Private bushfire shelters must comply with Table 2.4 criteria of ABCB *The Performance Standard for Private Bushfire Shelters 2014.* However, design and construction of a conforming shelter does not reduce RFS requirements for dwelling compliance with the BAL rating.

7.3 FURTHER BUSHFIRE CONSIDERATIONS

7.3.1 Mapping: NSW requires that Local Government provide bushfire prone land mapping to be reviewed and approved by the RFS every five years. The RFS has produced an on-line tool that matches address with whether that property is bushfire prone. However, the disclaimer states it's only valid for the day of search (!) and gives no assessment as to the BAL-rating or risk. Hence within NSW 'accredited persons' (generally meaning those accredited by the *Fire Protection Association of Australia – FPAA*) need to provide an individual bushfire assessment report at some cost to the applicant and prior to development application DA submission.

7.3.2 Vegetation types: The RFS has departed from the *AS 3959* vegetation classification and substituted that derived from Keith (2004). Of note is that the RFS measurement of distance from classified vegetation is specifically from the 'drip-line' – whereas *AS 3959* measures from the 'edge' which is commonly taken to be the trunk. Further differences are found in the BAL Tables (A1.12) which replace those in AS 3959. The PBP Tables decrease the separation distances for BAL-ratings – which means developments across NSW will have higher BAL ratings than they would under *AS 3959*, and indeed, nationally.

7.3.3 Complying development: The NSW legislation for 'Complying Development' does not give a role for the *RFS*, but effectively prohibits development in bushfire prone areas that are BAL-40 or BAL-FZ.

7.3.4 *Bushfire Design Brief* (*BFDB*): Where a performance-based solution is desired/required, the RFS requires that a BFDB be collectively agreed prior to the analysis and presentation. That is, stakeholders along with the RFS are to establish the performance criteria and measures to be analysed, using fire engineering principles.

7.3.5 *Asset Protection Zones* (*APZ*): *PBP* specifies the required/calculated widths of *APZ*s methodology within Appendices, plus 'everyday' requirements for tree canopy separation (2-5 m), no trees over-hanging buildings, discontinuous shrubs, mown grass and the like.

3.6 The 10/50 rule: The NSW government introduced this ruling that trees (to 10 metres) and vegetation (to 50 metres) may be removed 'as of right' on your property (only) if it is deemed bushfire prone land. The measurement is from the building wall to the vegetation and applies to residential and SFPP buildings. Heritage properties, aboriginal sites and steep land are exempt from the 10/50 rule.

7.4 TIMBER CONSIDERATIONS

External timber usage for residential buildings in NSW bushfire prone areas is generally restricted past BAL-29 to systems fire-tested to have an FRL 30/30/30 or FRL -/30/30 when tested from the outside. This may be achieved through layer(s) of moisture-resistant fire-rated plasterboard, plus selected timber cladding. The only exception for timber usage otherwise is for the poorly defined 'minor construction elements' that leaves decision-making entirely in the hands of the RFS assessment. Selected hardwood windows 'may' be acceptable … but the *Fast Fact* is silent on the permissibility of hardwood-framed doors. This arises as the NSW RFS has added an additional criterion to the AS 1530.8 fire test requirements series (ie. BAL-40 and BAL-FZ) in that 'flaming' is not permitted. Thus timber windows and (especially) doors that have actually passed the highest fire-test requirements to national Standards are not permitted for use across NSW.

7.5 NSW SUMMARY

With the recent release of the new *Planning for Bushfire Protection 2019*, NSW has the most comprehensive strategic planning requirements mandated for bushfire protection in Australia. Importantly, this document over-rules the *BCA/NCC* (construction) provisions and imposes a higher-level of bushfire protection measures across a wider range and Classes of building and uses than other jurisdictions. Residential developments within bushfire prone land greater than BAL-29 *must* be referred to the RFS for assessment – which in a significant minority of cases might vary from those of accredited BPAD consultants. Master-planning and multi-storey residential (and other) buildings in bushfire prone areas *may* need referral to the RFS for assessment. NSW local government is obliged to incorporate any and all bushfire conditions 'suggested' by the RFS.

7.6 TERMINOLOGY

Terms specific to this state include:

Acceptable solution	Measures which have been deemed to meet the specified performance criteria.
Asset Protection Zone (APZ)	A fuel-reduced area, being a buffer between the bushfire hazard and a building – including 'defendable space' for fire-fighting operations. The size of the APZ varies with slope, vegetation and the FDI.
BAL Certificate	A certificate that identifies the BAL rating for a development within the 'complying development' process.
Bush fire assessment report	A report required with a Development Application that determines the applicable BAL rating and compliance with *PBP.*
Bush Fire Prone Land map (BFPL)	A map prepared to RFS requirements and certified by the RFS Commissioner, available online through local government.
Bush fire Protection Measures (BPM)	A range of measures that includes APZ's, construction provisions, access, water & utility services, emergency management and landscaping – all to reduce the bushfire risk.

Bush Fire Safety Authority (BFSA)	An approval by the RFS Commissioner required for subdivision or a *SFPP* development.
Complying development	This is a combined simplified planning and construction approval that meets specified standards (but is not applicable past BAL-29).
Fire Danger Index (FDI)	The chance of a fire starting, its rate of spread, fire intensity and its potential difficulty of suppression – all related to temperature, relative humidity, wind speed and drought effects. *PBP* refers to the Forest Fire Danger Index & Grassland Fire Danger Index – but regulations generally use *FDI*.
Grasslands	As per AS 3959 definitions, being grass (exotic or native) maintained < 100mm (including lawns, golf courses, reserves, parklands, nature strips, nurseries, etc.
Grassland Deeming Provisions	An acceptable solution to properties in a grassland hazard area which can be used instead of site assessment to AS 3959.
Infill development	New buildings or renovations within an existing lot that does not require the spatial extension of services.
Inner Protection Area (IPA)	An area maintained and managed to minimise fuel loads so that a fire path is not created between the hazard and the building.
Integrated development	A development that required development consent and approval from one or more government agencies.
Outer Protection Area (OPA)	The outer component of an APZ where fuel loads are maintained at a lower level to reduce the intensity of an approaching fire.
Special Fire Protection Purpose (SFPP)	Developments with vulnerable occupants that require a lower radiant heat threshold in order to allow evacuation of occupants and emergency services.

7.7 REFERENCES

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7.8 ACKNOWLEDGEMENTS

David Boverman, Manager, Development Planning & Policy, NSW Rural Fire Service.
Corey Shackleton (now former) Director - Community Resilience, NSW Rural Fire Service.

8 NORTHERN TERRITORY

The Northern Territory has a large land mass with frequent extensive bushfires across the many landscapes, from low-rainfall rangelands in central Australia to northern tropical savannahs with heavy seasonal rain. Records show that in any given year, up to 29% of the territory has burned. Consequently, fire management requires very different approaches to the more populated parts of Australia, where bushfire agencies are funded and structured professionally for emergency response, incorporating many volunteer brigades.

Within the NT, fire management is regarded primarily as the responsibility of the landholders /occupiers who have a statutory duty to protect the property from bushfires and prevent or inhibit its spreading into adjacent land. This is regarded part of normal land management – not a responsibility of government or a fire control service as is seen in other states. The *Bushfire Regulations* enforce the reality that there is no bushfire safety entitlement within the Territory. A 'whole of community' response is deemed necessary, with coordination and planning, mitigation and monitoring, rather than exclusion and suppression. There is increasing awareness and involvement of indigenous land management and bushfire practices.

The relationship between the centralised *Bushfires NT* and the scattered volunteer bushfire brigades has been tested. The NT has around 22 bushfire brigades with around 500 active volunteers with brigades that are semi-independent but with some oversight and emergency direction from *Bushfires NT*. Nevertheless, within and near towns, the regular fire-brigade (*NT Fire and Rescue Service (NTFRS))* as an agency is heavily involved.

There is no web-based information on building and regulatory matters within bushfire prone areas for the Northern Territory. Therefore, we must assume only the standard *BCA/NCC* requirement for the application of *AS 3959-2018* for Class 1 dwelling and Class 10a building or deck associated with a Class 1 dwelling must apply.

8.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

The NT's *Bushfires Management Act 2016* provides the framework for managing bushfire in areas outside the 'Emergency Response Area' (ERA) of five cities and towns across the NT. This Act requires the establishment of local/property *Bushfire Management Plans* and *Regional Bushfire Management Plans,* all as cooperative endeavours between various stakeholders – government agencies and private entities alike.

Outside the *Emergency Response Areas* the Territory is divided into five *Fire Management Zones (FMZ)* administered by *Bushfires NT*. Within the *FMZ*s, rural residential areas and areas of intensive agriculture or horticulture adjacent to the major towns are then declared *Fire Protection Zones (FPZ)*. There is then a hierarchy of stakeholder roles, from regional Bushfire Councils, local Bushfire Committees, Fire Control Officers, Fire Wardens through to volunteer bushfire brigades.

Both town planning and building regulations are silent on bushfire matters, suggesting that the requirement is to comply with *BCA/NCC* which calls up AS 3959 (only). Yet there is no current web information on BAL ratings and/or assessors in the Territory.

Table 8.1: The relevant NT bushfire regulatory agencies.

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS regarding bushfire
Department of Environment and Natural Resources – with the following agency a small coordinating division. ***Bushfires Northern Territory (BushfiresNT)***	***Bushfires Management Act 2016*** ***Bushfire Management (General) Regulations 2017*** ***Bushfires Management (Volunteer Bushfire Brigades) Regulation 2006***

NT Fire and Rescue Service (NTFRS) ***Department of Infrastructure Planning & Logistics*** – Lands Planning ***Department of Lands, Planning and the Environment –*** Building Advisory services	***Fire & Emergency Act*** ***Planning Act 1999*** in final stages of review *Northern Territory Planning Scheme* ***Building ……***

8.2 LEGISLATIVE REQUIREMENTS (codes)

The NT has an established hierarchy of responsibility across the diffuse organisational relationships involved in bushfire and land management issues – essentially through emergency management controls.

- **Bushfires NT** provides operation standards, training, volunteers and chain of command during bushfires.
- **Fire Control Officers (Chief /Senior /Officer)** that are employees with strong powers in time of fire emergency to enter lands, control fires, take water, close roads, demolish vegetation and structures and the like, without hindrance.
- **Bushfires Councils** appointed by the Minister to advise
- **Regional Bushfire Committees** appointed by the Minister that recommend bushfire mitigation, management and suppression controls in its fire management zone and endorse regional bushfire management plans prepared by Bushfires NT.
- **Fire wardens** with the local power to permit fire lighting.

8.2.1 Building classifications requiring bushfire protections

The BCA/NCC calls up residential classes of buildings, which then mandates compliance with *AS 3959* or *NASH* (steel) *Standard*:

- Class 1
- Class 2
- Class 3
- Class 10a deck associated with a Class 1 building.

8.3 SUMMARY

Regulatory controls and guidance for bushfire and building appear to be non-existent within the Northern Territory. Their bushfire concerns are broader-scale, relating almost entirely to land management issues and regulations. There is no centralised government bushfire organisation with remit and staff to plan-for and control bushfires. There is no mention of 'bushfire' or 'bushfire regulations' within planning or building documents available on-line.

8.4 TERMINOLOGY

Table 8.1: Terms specific to the Northern Territory

Area Fire Management Plans	A published management plan pr*epared by Bushfires NT for a Fire Management Area*.

Emergency Response Areas (ERAs)	Areas around greater Darwin and 50 km around Katherine, Tenant Creek and Alice Springs, where the regular fire brigade (*NT Fire & Rescue*) primarily operates.
Fire Management Zone (FMZ)	Outside *ERA*s, these five broad areas are designated for regional fire management plans -
Fire Protection Zones (FPZ)	*FPZ*s are declared within *FMZ*s to cover rural residential areas around towns, plus nearby intensive agriculture.
Prescribed fire break	A legislated requirement for property managers to establish a cleared four-metre wide firebreak with low/no fuel.
Property Fire Management Plan	A *Fire Management Plan* prepared for a property within a *Fire Management Zone* that may be required by *Bushfires NT* that specifies mitigation, management and suppression of fire on the land.

8.4 REFERENCES

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9 QUEENSLAND

As a state with large variations in topography, rainfall and vegetation, plus dispersed communities, bushfire has been of increasing concern. Warm year-round, dry winters are usually followed by hot humid summers that are drier the further west you go. Rainfall ranges from over 3 metres monsoonal rain per annum in the north-east coastal region, down to 500 - 800 mm elsewhere. Surprisingly, just one FDI applies to the whole state – FDI 40 (to AS 3959) – which recent studies have shown is an inappropriate averaging.

Queensland has had a long history of community fire-fighting – the *Queensland Rural Fire Service* being established from 1949. With around 36,000 volunteers (5,000 active) and 1,400 rural brigades, there are around 2,100 staff in paid positions. The *QRFS* is organisationally part of the larger *Queensland Fire & Emergency Services (QFES)* from 2013, that also includes the *Queensland State Emergency Services* (*QSES*) and the *Queensland Fire & Rescue Service* (*QFRS*).

With the recent and extensive spring bushfires across much of Queensland, the emergency management review of 2018-2019 (*Office of Emergency Management*) will doubtless be further pursued. There is a regulatory recognition that fire events are becoming more frequent and severe, including areas (ie. rainforests) that were previously thought to be immune. The bushfire hazard and risk varies widely across the state. The AS 3959-2018 *Forest Fire Danger Index* (*FDI* for short) for Queensland is just 40. However research (before the most recent fire season) had recognised the risk for south-east Queensland and Cape York bio-regions to be FDI 50, rising to 130 in south-western Queensland (QFES 2018, p.16). It should be noted that an FDI of 100 has been the accepted maximum index within *AS 3959-2018*.

9.1 PLANNING & BUILDING REGULATORY FRAMEWORK – Bushfire Requirements

The *Queensland State Planning Policy* (*SPP*) is a statutory planning instrument under the Planning Act (2016) and Regulations in giving guidance to local government on matters of state-wide significance. Bushfire matters receives only a minor mention under 'planning for safety and resilience to hazards'.

Queensland has a separation of powers between the *Planning Act 2016* and the regulation of building work under the *Building Act* – which calls up assessment under the *BCA/NCC* and the *Queensland Development Code* (QDC). The *QDC* consolidates building standards into a single document outside the scope of, and in addition to, the *BCA/NCC*. If there is an inconsistency, then the *QDC* prevails.

The *QDC* sets out design, setback and siting requirements for Domestic Class 1a (detached dwelling house) and associated Class 10 buildings/structures (garages, carports, sheds, water tanks and pools), as well as dual occupancies - except where the local planning scheme identifies an alternative siting or setback provision. Where there is a difference between the local planning scheme and the *QDC*, the local planning scheme overrides the *QDC*.

The *State Planning Policy* is a broad and comprehensive statutory planning instrument. It sits above regional plans, standard planning scheme provisions and planning schemes within the hierarchy of planning instruments outlined in the Planning Act. The *SPP* has effect throughout the entire state. Where an inconsistency exists between the *SPP* and a planning scheme, the *SPP* prevails to the extent of the inconsistency.

Table 9.1: The relevant Queensland bushfire regulatory agencies

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS
Queensland Fire & Emergency Services (QFES) with operational arms being: • ***Fire & Rescue Service Queensland (FRSQ)*** • ***Queensland State Emergency Services (QSES)*** • ***Rural Fire Service Queensland (RFSQ)*** ***Department of State Development, Infrastructure and Planning (DSDIP)*** ***Queensland Government Department of Housing and Public Works (DHPW)***	***Fire & Emergency Services Act 1998 (Qld)*** ***Sustainable Planning Act, 2009*** ***Sustainable Planning Regulation, 2009*** ***Building Act 1975, 2011*** ***Building Amendment Regulations 2016*** ***Queensland Development Code*** ***The Planning Act 2016*** ***Planning Regulation 2017*** *+ Planning .. Amendment Regulation 2019* ***State Planning Policy (July 2017)***

9.2 LEGISLATIVE REQUIREMENTS (Codes): Planning

Bushfire State Planning Policy (SPP) was implemented through the 'Department of State Development, Infrastructure and Planning' from 2 December 2013 based on CSIRO spatial information research, seeking to mitigate adverse impacts of bushfires through land-use planning. Importantly, the *Potential Bushfire Hazard (PBH)* was used to estimate the worst possible weather and fuel conditions for a rational assessment of the worst possible fire line intensity - without consideration of climate change effects. Hence it is predicated on wildfires or planned burns from 1987 to 2014 – conservatively meaning recent past history (Newnham et al. 2017).

Local planning schemes: Whilst these must account for bushfire prone areas at Development Approval stage, it has been 'simplified' in that properties < 1,100 m^2 are exempt from the requirement to provide a site-specific Bushfire Attack Level assessment (Mondaq). However, a more general local bushfire assessment is assumed.

Alteration to existing buildings: An application for a building permit (for buildings constructed prior to 1 May 2018) for alterations, additions, improvements or repairs (Class 1, 2, 3 buildings or 10a decks - when less than 6 metres from Class 1-3) will not be required to upgrade for bushfire compliance ("excluded work") provided that the work value is < $20,000; it doesn't increase the bushfire ignition risk; and does not include installation of roof-mounted evaporative air-conditioning unit on the roof. Effectively, this means that building permits for new residential buildings and most renovations must comply from that date forward.

Certificate of building compliance: A change of building use to a residential Class in a bushfire prone area must have a certificate of building compliance that includes a *BAL rating* for the site or structure with measures such as an 'alternative solution', so as to conform to building standards.

9.2.1 *State Planning Policy* (*SPP*) framework

The primary aim of the *SPP* is to direct the role of local government planning schemes with development requirements within hazard areas including bushfire. The initial SPP has been upgraded (July 2017) to include interactive mapping. This covers:

- Lot layout,
- Property access,

- Management of open space including protection of classified vegetation,
- Water supplies for fire-fighting.

The *SPP* is supported by the CSIRO bushfire mapping, which is based on a combination of potential fire weather severity (ie. *Forest Fire Danger Index* for a 1:20 year – meaning 5% chance annually), landscape slope (at a GIS resolution of 25 metre grid) and potential fuel load (vegetation hazard class), all to provide the formula below. Use the state-wide bushfire hazard mapping (discussed below) or use that methodology using local-scale vegetation and slope maps.

Figure 9.1: *SPP* Method for calculation of potential fire-line intensity (QFES 2018, p.13)

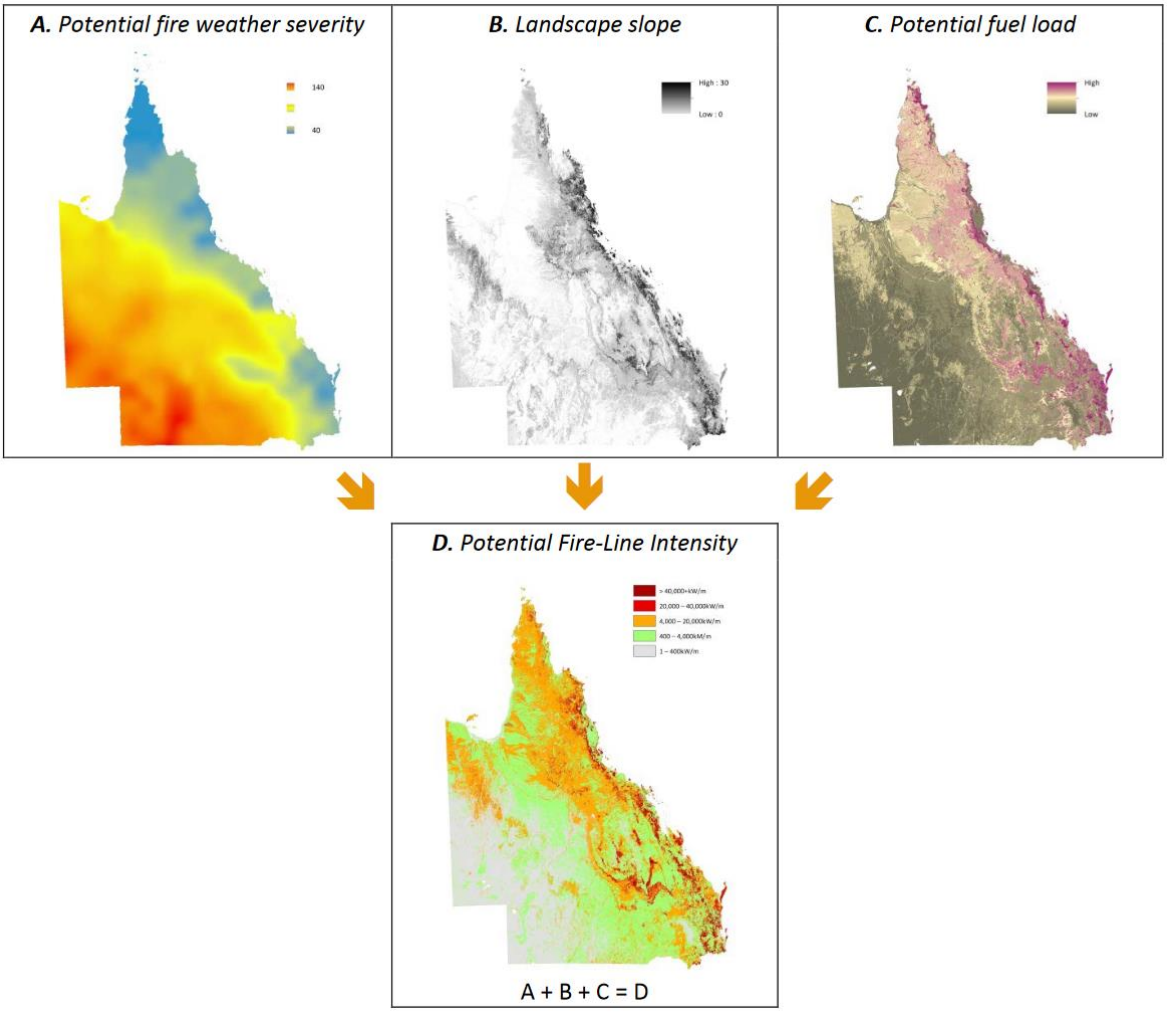

Figure 9.2: State-wide mapping (here at a vastly-reduced scale)

Fuel load potential: Fuel loading (tonnes/hectare) mapped across 20 *Vegetation Hazard Classes* (*VHC*) with ten years fuel accumulation
Landscape Slope: Mapped from flat 0 to 45 degrees
Fire Weather Severity (FWS): Forest Fire Danger Index estimated for 2050 (values from 50 to 130)
Potential Fire-line Intensity (PFI): The resultant bushfire fire-line intensity mapping (numbers) was then adjusted for their potential bushfire intensity which is a standardised measure of the rate that an advancing fire head would consume fuel energy per second, and per metre of the fire front. The trigger for being a designated 'Bushfire Prone Area' is a fire-line intensity of 4,000 kW/m. Three bushfire hazard categories have been established, for different scales of fire intensity:

- **Very high** potential bushfire intensity (40,000+ kW/m)
- **High** potential bushfire intensity (20,000 to 40,000 kW/m)
- **Medium** potential bushfire intensity (4,000 to 20,000 kW/m)
- **Low** hazard area (0 to 4,000 kW/m)
- **Grassfire Prone Area** (generally less than 4,000 kW/m)
- **Potential bushfire buffer** (default width of 100 metres)

This CSIRO state-wide mapping (see simplified Figure 2 above) has been found to be 90% reliable, with further, more-localised assessment (such as through LiDAR) increasing the accuracy (Leonard et al, 2014).

9.2.2 Bushfire hazard overlay maps

Since 2014, Queensland has used the vegetation mapping as the basis of identifying land within *Bushfire Hazard Areas*. These can be found online with the bushfire hazard overlay for Queensland plus local government interactive maps. Any property identified on the overlay mapping as being within an area of potential bushfire intensity or impact buffer triggers building controls to *AS 3959* and the *BCA/NCC*.

9.2.3 Vegetation hazard classes:

In producing the state-wide bushfire hazard mapping, 119 Queensland vegetation types and their potential fuel loads were reduced to 20 vegetation hazard classes. In many local government areas, these have been refined to address more localised vegetation communities and hazard classes.

9.2.4 Performance and acceptable outcomes

For a project to be 'accepted development' it must meet the all the outcomes of the *Bushfire Overlay Code.* If it doesn't or can't, then the development becomes 'assessable development' and a development application is required. Written into planning state and local schemes are Tables that set out Performance outcomes and more detailed Acceptable outcomes. The list varies between Councils.

Local government planning codes follow similar (but localised) requirements, usually based upon the following concepts:

Description	Safety requirements
Site-specific bushfire hazard assessment	Dependent upon the 'building protection zone' (separation distance) and the lot size, the hazard assessment may include the BAL rating and the wide range of bushfire safety criteria.
Density	Limiting new development to places that are ≤BAL 29. Further provision for uses that involve vulnerable persons (ie. within BCA/NCC Class
Separation distance from vegetation	Minimum 20 metres separation to classified vegetation or BAL 29, whichever is the greater. Minimum 10 metres from low threat vegetation or ≤BAL 29
Accessibility	Access minimum 4 m wide to and around each building, with cross-fall < 5% and longitudinal gradient < 25%.

Building location	Not on a ridge-line, not on land sloping > 15%, and located on east to south facing slopes.
Driveways	Minimum width of 3.5m, not to exceed 100m in length and with gradient < 12.5%.
Water supply	Varies with the Council, from 5000L (peri-urban dwelling) to 10,000 L more generally (rural dwelling) reserved for fire-fighting.
Hazardous chemicals	No manufacture or storage of hazardous chemicals.

9.2.5 Defendable space & vulnerable persons

The draft *QFES* (2018) emphasises the need for defendable space between buildings and hazardous vegetation in creating a 'low-fuel' buffer zone that lessens the risk to both fire-fighters and buildings. The more recent *Bushfire Resilient Communities* (2019) cites 78% of fatalities occur within 30 metres and 85% of fatalities occur within 100 metres of hazardous vegetation (forest edge) in Australia. Hence development should be sited in locations of the lowest hazard within the lot and 100 metres setback is becoming mandated.

Where vulnerable persons, essential services or fire-fighters are involved, the heat flux is required to be <10kW/m^2 which then requires considerable separation from the fire hazard (ie. 100 metres). Where development "is for any other purpose" (buildings, building envelopes, lot boundaries) are to be designed and located to achieve an exposure of < 29kW/m^2. Building-to-building separation is to be > 12 metres. Where an extension or infill development cannot meet these requirements, then a higher level of building protection is required. Such requirements create approval and compliance difficulties for all new development and/or modifications to existing non-compliant properties (which is likely most of the existing development).

9.2.6 *Bushfire Hazard Assessment* (*BHA*)

Where a local government planning scheme suggests/requires an applicant prepare a *Bushfire Hazard Assessment* the following procedure is required within a report and/or as part of a *Bushfire Management Plan* (BMP) – see 9.3.3 following.

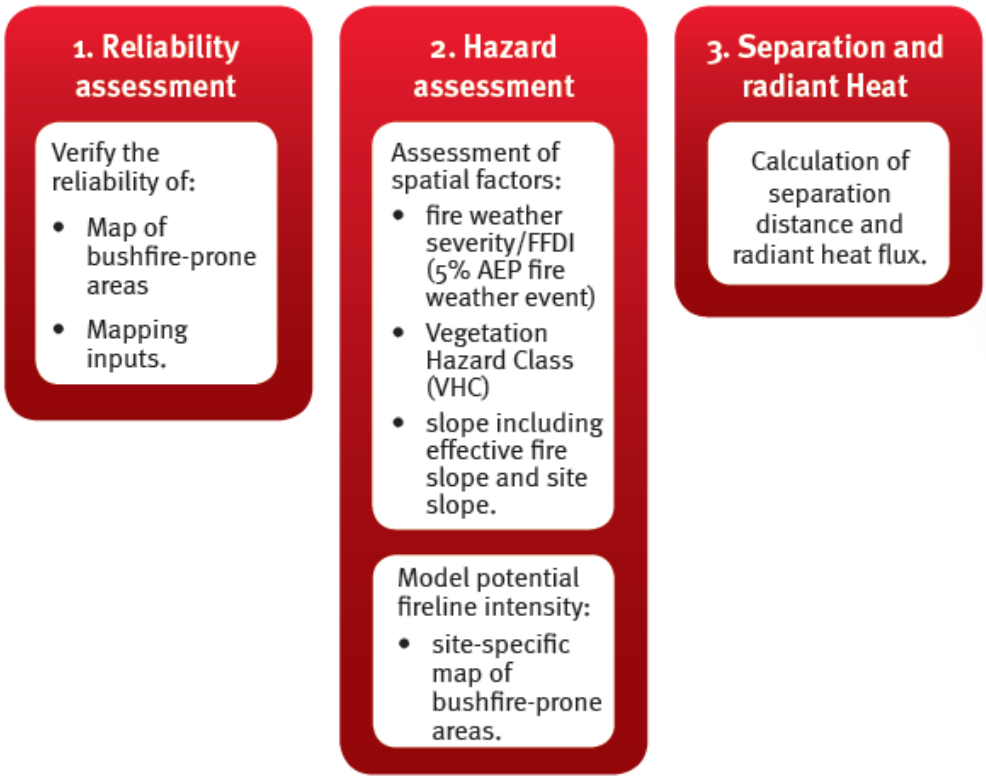

Figure 9.3: Bushfire Hazard Assessment process (*Bushfire Resilient Communities*, 2019, Figure 11)

Underlying this process are statutory requirements set out for a:

- Vegetation Hazard Class assessment,
- Calculation of Asset protection Zones,
- Bushfire Management, Vegetation Management or Landscape Maintenance plans.

9.3 BRISBANE BUSHFIRE PLANNING POLICY

Brisbane City Council has developed its own policy requirements for development applications within bushfire hazard areas – quite distinct from the rest of the state. This requires site specific investigation if it is within the bushfire overlay mapped zone. The six-bushfire hazard sub-categories within the SPP framework (see dot points within 9.2.1 above) have been extended to also include buffer areas as below:

- *High hazard area sub-category;*
- *Medium hazard area sub-category;*
- *High hazard buffer area sub-category;*
- *Medium hazard buffer area sub-category;*
- *Potential impact sub-category;*
- *Very high potential bushfire intensity sub-category;*
- *High potential bushfire intensity sub-category;*
- *Medium potential bushfire intensity sub-category;*
- *Potential impact buffer sub-category.*

9.3.1 Site-specific bushfire hazard assessment

Step 1: Brisbane City Council lists 62 vegetation communities and then provides a 'hazard score' from 0 to 10.

Step 2: A Table presents a 'hazard score' for slopes (1 being near flat … 5 being slopes over 30%).

Step 3: Aspect Table presents a 'hazard score' (0 east to south … 3.5 north to north-west).

Step 4: Combine scores to identify the severity of bushfire hazard (1 to 5.5 = Low, 6 to 12.5 'Medium' and 13 + is 'High'. Surprisingly, it then calls up the 1999 version of AS 3959 'level 1' requirements for 'High'.

Step 5: Field verification.

Step 6: Qualitative assessment, noting that bushfire behaviour is highly variable.

Step 7: Add a safety buffer: 'High' being 100 metres, 'Medium' being 50 metres, 'Low' not applicable.

9.3.2 Prepare a bushfire management plan

Brisbane City Council broadly specifies who is a suitably qualified professional person under three strands to assess hazard and mitigation, including accreditation as BPAD Level 2/3. Queensland generally has no requirements or limitations on qualifications required to be a bushfire consultant for everyday BAL assessments.

9.3.3 *Bushfire Management Plan (BMP)*

Required from applicants is a detailed hazard assessment to accompany a development application. This is to include:

- Strategies to mitigate the impacts … and facilitate an effective response.
- A site-specific hazard assessment (with methodology in accordance with 3.1 above),
- Specific bushfire risk factors for the people and uses proposed for the site.
- Mitigation measures regarding embers, radiant heat, flame contact and smoke.
- Recommendations for safe mitigation actions such as access, site layout, fire trails, vehicular movements, fire-fighting, evacuation, landscaping, education, maintenance…

- Potential fire-line intensity (ie. flame length, rate of spread, radiant heat flux),
- Bushfire protection measures (ie. siting, design, separation, access, water supply, vegetation management, landscape management),
- Code compliance with the *SPP,*
- Appropriate maps and diagrams (ie. defendable space, fuel management, access and evacuation routes).

9.4 TIMBER CONSIDERATIONS

There are no special requirements or limitations apparent upon timber usage, past the restrictions imposed by *AS 3959-2018* through application of *BCA/NCC*.

9.5 QUEENSLAND SUMMARY

Queensland generally has established it's own sophisticated bushfire hazard assessment system prioritising vegetation classifications that has little connection to *AS 3959* methodology. There are no mandated requirements for bushfire protection methods under the *BCA/NCC* for vulnerable uses (ie. schools, hospitals), yet Queensland seeks defendable space and separation from bushfire hazards by 100 metres or 10 kW/m^2. Similarly, whilst there are statements of the need for emergency access, urban design, fuel-reduced landscaping and fire-fighting water supply etc. there appears to be no mandated requirement as much relies upon local government. Emphasis is entirely upon new development and remains silent on retrofitting existing building stock for better bushfire safety. Whilst there are restrictions upon building locations (where identified within the bushfire overlay), requirements for stored water for fire-fighting, and separation to classified vegetation, there is little reference to bushfire construction standards or controls through *AS 3959-2018.*

9.6 TERMINOLOGY

Table 9.2: Terms specific to this state include:

Building Protection Zone	The required low fuel set-back 'defendable space' between designated vegetation and the building – generally given as 20 + metres.
Bushfire hazard area	Same meaning as bushfire prone area. The regulatory trigger is 4,000 kW/m of fire-line intensity (see below).
Bushfire hazard overlay code	Mandated bushfire siting, design and management requirements within local government development codes.
Bushfire Management Plan (BMP)	A detailed written bushfire hazard management plan required as part of a DA for Brisbane Council.
Fire Weather Severity (FWS)	Forest Fire Danger Index estimated for 2050 (with values from 50 to 130)
Fuel load potential	The weight per hectare of readily combustible fuel for different vegetation hazard classes, which varies between 0 and 35 tonnes/hectare.
Potential Bushfire Hazard (PBH)	A measure of past wildfires and planned burns used in estimating the worst weather and fuel conditions anticipated (before climate-change considerations).
Potential Fire-line Intensity (PFI)	This index is a combination of fuel loading, slope, and weather to give a standardised measure of the rate that an advancing fire head would consume in fuel-energy per second, per metre of fire front.

Vegetation hazard classes	Queensland (CSIRO) has mapped twenty *Vegetation Hazard Classes* that includes 10 years of anticipated fuel accumulation to obtain fuel loadings (tonnes/hectare).

9.6 REFERENCES

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9.7 ACKNOWLEDGEMENTS

Eldon Bottcher, *Eldon Bottcher Architect* (BPAD-Level 3 Practitioner)

10 SOUTH AUSTRALIA

SA is a generally flat and a somewhat arid state characterised by extensive mallee, shrubland and grassland vegetation. Only the southern parts nearer the coast receive reliable but low rainfall, whilst sharing the same hot dry summers. There is comparatively little treed forest (5%), but for woodland along the ranges and near Adelaide – this region housing three-quarters of SA's population. Hence with a significant history of bushfire devastation (ie, 1983, 2005, 2019/20), the state-wide *Fire Danger Index* of FDI 80 is very much an averaging.

The first South Australian legislation regarding the control of wildfire was as early as 1847, where the concern was reckless burn-offs of stubble and grass fires. By 1913 the government gave Council's the power to appoint fire control officers which led on to rural district fire-fighting associations. During WW II volunteer *Emergency Services Brigades* (ESB) were formed and equipped, that led on to becoming a statutory authority from 1976 when the government passed the *Country Fires Act* which then established the *SA Country Fire Service.* From 1989 the service was standardised across the state and equipment upgraded. The *SA Fire and Emergency Services Act 2005* became the governing legislation, with community volunteers remaining the backbone of the service. SA has around 13,500 *CFS* volunteers within 425 brigades and 109 paid staff.

The SA government established a Bushfire Task Force in 2009 to analyse the findings of the Victorian Bushfires Royal Commission to determine future strategies for SA. This led to the *Country Fire Service* becoming the 'Rural Fire Hazard Leader' when dealing with bushfire emergencies. Part of this is evident in the designation and publicity around 'Bushfire Safer Places' and 'Bushfire Last Resort Refuges'. The *CFS* has a planning and development role within designated *Bushfire Protection Areas* through automatic referral (around 800 per annum), followed on with construction matters to *AS 3959 - 2018.*

10.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

South Australia is currently in the final stages of replacing their main planning Act and Regulations (by mid-2020).

Currently, the development approvals procedure is three-step:

1 **Development Plan Consent** application against planning rules including CFS bushfire referral where within an identified *Bushfire Protection Area*.
2 **Building Rules Consent** which includes the BCA/NCC and Ministers Specification SA 78 regarding bushfire matters.
3 **Development Approval** is issued (time limited) when both of the above stages are met.

Referrals for all development within bushfire protection areas goes to the *SA Country Fire Service Development Assessment Unit* for advice, including their determination of the applicable BAL-rating. They are granted a statutory period of six weeks to make their report with approval conditions, or refusal of an application. The Council must comply with their direction.

Should an application include a 'Private Bushfire Shelter' then specific requirements apply (including reference to the ABCB *Handbook on Private Bushfire Shelters 2014*) and development plus building approval is made by the Building Commission of the *State Commission Assessment Panel* (SCAP) – essentially acting as a disincentive. Specifically, the SA *CFS* does not endorse the usage of private bushfire shelters or bunkers that are not built to the *Private Bushfire Shelter Performance Standards.*

Table 10.1: The relevant SA bushfire regulatory agencies.

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS regarding bushfire
SA Country Fire Service (CFS) ***SA Department of Planning Transport & Infrastructure***	***Fire and Emergency Services Act 2005*** ***Development Act 1993*** *is to be replaced by* ***Planning, Development and Infrastructure Act 2016*** *by mid-2020.* ***Development Regulation 2008*** is to be replaced by ***Planning, Development and Infrastructure regulations 2019***

10.2 LEGISLATIVE REQUIREMENTS (Codes)

10.2.1 Extent of building types requiring bushfire protections

The Ministers Specification (SA 78, May 2011) calls up Class 1, 2 and 3 buildings within a designated bushfire prone area. Tourist establishments are also subject to protections measures within 'high' risk areas. The regulations mandate that there will be bushfire fighting equipment and water supply to all such properties, as below. There are no mandated restrictions or conditions on alterations and additions within bushfire zones – with requirements very much dependent upon the individual project and *CFS* determination.

10.2.2 Defining bushfire prone area

SA has used risk analysis techniques to draw together the various bushfire indices into mapping of *Bushfire Protection Areas*. This include satellite imagery of slope, topography, weather statistics, vegetation date (including fuel loads) plus population growth. This resulted in mapping of three levels of bushfire risk across the state (see Figure 10.1 below):

- General bushfire risk
- Medium bushfire risk
- High bushfire risk.

This resulted in 39 Council areas having designated *bushfire protection areas* within their boundaries, all of which is available from state and local planning on-line search tool, from broad-scale presentation down to individual properties.

There is currently no restriction on qualifications for making a bushfire risk assessment or report.

10.2.3 Bushfire protection & water supply systems

Compliance with the mandated systems for Class 1, 2 and 3 properties is assessed through a site-specific protection system with water supply, pump, pipework and hoses as specified in *SA 78*:

- **Water supply:** Storage of 2000L for *general* and *medium risk* where connected to mains water (and 5000L where there is no mains water); 22,000L storage for all *High risk* areas (whether connected to water mains or not). Fire fittings must comply with fire authority requirements. Full water capacity must be maintained and the tank must be non-combustible if above ground.
- **Pumps:** The pump (petrol or diesel) must have a power rating at least 3.7 kW (5hp) and be able to operate independently of mains electricity with minimum inlet diameter of 38 mm.
- **Pipework:** All non-metal pipes and connections shall be at least equal to pump inlet diameter and buried below ground (300mm), except for flexible connections and hoses.

- **Hoses:** Are to be available at all times, have a maximum length of 36m, be capable of withstanding the water pressure, have a minimum 18mm internal diameter, and be located so that all parts of the building are within reach of the nozzle and to provide maximum coverage.

10.2.4 *High* bushfire risk area requirements

All new dwellings and tourism accommodation must have:

- Dedicated fire-fighting water supply of 22,000 litres,
- No gaps between ground and floor to prevent burning debris from entering,
- Be set back 20 metres from flammable or combustible vegetation,
- Be located and designed to minimise bushfire risk,
- Have access roads/tracks designed and built for entry/exit of vehicles including those of fire- fighting.
- A site assessment of BAL rating in accordance with AS 3959 is required to be submitted to Council or certifier as part of the *Building Rules* consent.

10.2.5 *Medium* bushfire risk requirements

All new dwellings and tourism accommodation must respond to the relevant local area development plan and have:

- Dedicated fire-fighting water supply of 2,000 litres,
- No gaps between ground and floor to prevent burning debris from entering,
- Be set back 20 metres from flammable or combustible vegetation,
- Be located and designed to minimise bushfire risk,
- Have access roads/tracks designed and built for entry/exit of vehicles including those of fire- fighting.

Such buildings may be built to the construction requirements of BAL-12.5 (sparks and ember protection only) or they may choose to have a site-specific bushfire assessment.

10.2.6 *General* bushfire risk area requirements

Property development in general bushfire risk areas are assessed against the provisions of the relevant local area development plan.

All new dwellings and tourism accommodation must respond to the relevant local area development plan and have:

- Dedicated fire-fighting water supply of 2,000 litres,
- No gaps between ground and floor to prevent burning debris from entering,
- Be set back 20 metres from flammable or combustible vegetation,
- Be located and designed to minimise bushfire risk,
- Have access roads/tracks designed and built for entry/exit of vehicles including those of fire- fighting.

10.2.7 *Excluded* area requirements

These areas are typically townships with adequate fire-fighting capacity including emergency vehicle access. The exception is areas within 500 metres of a high-risk area, where any new development must conform to BAL-Low (Note: an outdated reference to the 1999 version of *AS 3959*). Where new buildings in excluded areas are within 100 metres of an adjoining high-risk area, then they must have a site assessment in accordance with AS 3959 to determine the applicable BAL level.

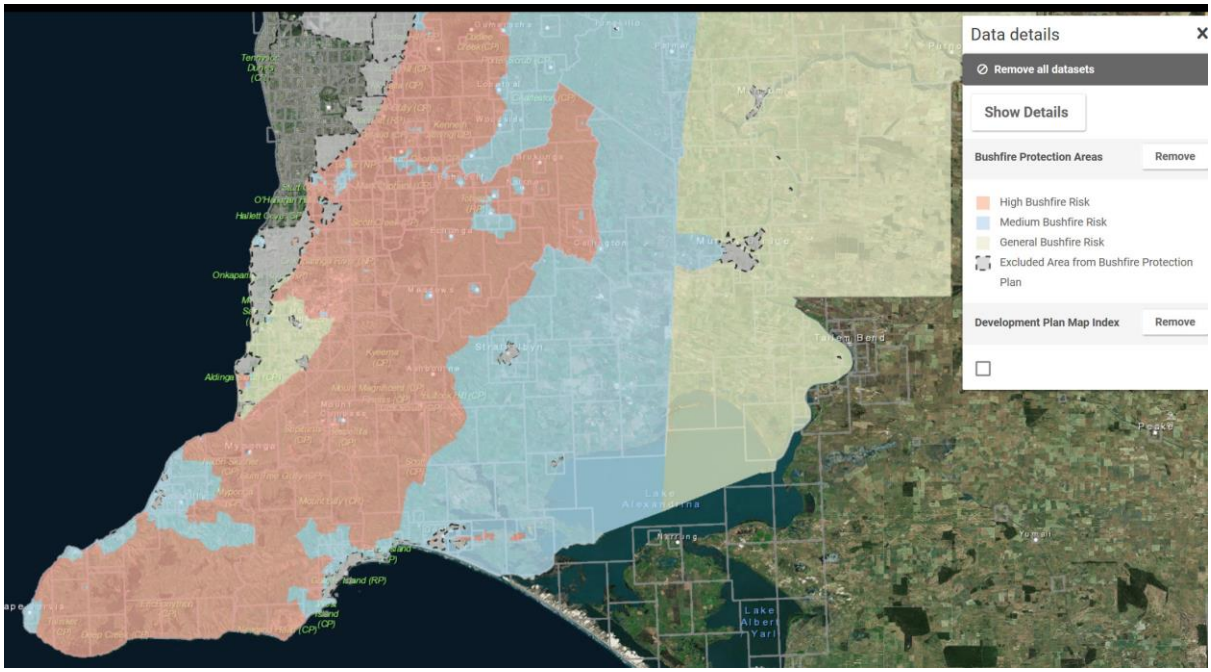

Figure 10.1: Bushfire mapping of Adelaide and south
(Source: http://location.sa.gov.au/viewer/?map=hybrid&x=138.37597&y=-34.92124&z=9&uids=26,113)

10.3 MINISTERS CODE (revised to 2012)

The *Ministers Code* is related to the 1993 Development Act which will shortly be replaced, so enhanced bushfire safety requirements are likely.

10.3.1 Land subdivision

A schedule within the *Development Regulations 2008* sets out the detailed requirements, similar to most other jurisdictions. Subdivisions within High Bushfire Risk Areas require a buffer zone which may be through a perimeter road or other means.

10.3.2 Building construction requirements

As outlined above, *High* bushfire risk requires an individual site assessment "by any person" but the assessment decision will be made by the building surveyor. The Ministers Code requires an application to demonstrate compliance with construction requirements as set-out in *AS 3959* – but without referencing or mandating that Standard.

10.3.3 Alterations and additions

The *Code* states that bushfire building requirements only become mandated for existing buildings when Development Approval is required. It states that for small work only the new work must conform to bushfire requirements. Where alterations and additions "significantly increase the size of the existing floor area.." (undefined) then the relevant authority may require the entire building be upgraded to meet current bushfire requirements.

10.4 TIMBER CONSIDERATIONS

There are no special requirements or limitations upon external timber usage, past the restrictions imposed by *AS 3959-2018* through application of the *BCA/NCC*.

10.5 SA SUMMARY

In South Australia the bushfire regulations are to be called up within the proposed new *Planning Act* and *Regulations* that are due for implementation by mid-2020. The broad-scale online bushfire mapping triggers three levels of bushfire risk (and 'exclusions'), which then calls up more specific planning requirements as determined by local Council's who then apply 'Building Rules'. Whilst there is a general requirement for 20 metres set-back from combustible vegetation across all hazard levels, stored water for fire-fighting is limited in 'Medium Risk' (2,000L) area, rising to 22,000L in 'High'. Of note is that 'Medium' bushfire risk is deemed equivalent to just BAL-12.5 in relation to *AS 3959*.

There is little direct reference to *AS 3959* construction standards other than for more general reference to conformity with *BCA/NCC* requirements. Similarly, individual bushfire assessment reports are only required in 'High' risk areas with generalised list of contents and no statement about necessary qualifications to undertake such reports. So, prior to the upcoming legislative changes, South Australia bushfire planning and construction requirements can be characterised as very 'light' compared to elsewhere.

10.6 TERMINOLOGY

Terms specific to this state include:

Bushfire Protection Area	This designation is similar to the wider notion of bushfire prone areas – but makes a legislated distinction as to area that require 'protection'.

10.7 REFERENCES

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10.8 ACKNOWLEDGEMENTS

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11 TASMANIA

As an island south of the mainland, Tasmania is the coolest and wettest state with a cool/cold-temperate climate and four distinct seasons. Both rainfall (to 2400mm) and topography are high on the west coast and plateau, bringing considerable biodiversity. Tall open eucalypt forest is extensive, with pockets of rainforest, heath and grasslands scattered across the island. Population is centred on Hobart (42%), Launceston (21%) and Burnie/Devonport (16%) which essentially is the east and north of the state. With high rainfall and low evaporation, forest and vegetation is highly susceptible to bushfires after even a comparatively short drought period. It should be noted that all of Tasmania has a FDI of 50 which is 'severe', but a FDI significantly less than all southern states and territories.

The major loss of life and property to bushfires (ie. 1966-67) has been followed more recently with extensive burning including central plateau World Heritage areas, where wild-fires were previously unknown. From the late 1990's government agencies had produced guideline documents regarding *'Living with Fire in Tasmania'* (ie. 2005) that canvassed all the major practical issues (non-regulatory) as useful advice. Since then, the Tasmanian government has introduced reforms for bushfire prone areas from 2012, cognisant of local concerns plus the 2009 Victorian Bushfires Royal Commission recommendations. More recently this has led to a comprehensive suite of bushfire documentation followed by a comprehensive list of advisory notes, Bulletins for professionals, plus legislative requirements.

Table 11.1: The relevant Tasmanian bushfire regulatory agencies.

AGENCIES involved with bushfire issues	LEGISLATION & REGULATIONS regarding bushfire
Tasmanian Fire Service (TFS)	***Fire and Emergency Services Act 2005***
The Tasmanian Planning Commission	***Land Use Planning and Approvals Act 1993*** ***Planning Directive No 5.1 /Bushfire Prone Area Code***
Consumer, Building & Occupational Services (CBOS)	***Building Act 2016*** ***Building Regulations 2016 (Part 5)***

11.1 LEGISLATIVE REQUIREMENTS

11.1.1 *Planning Directive No. 5.1 Bushfire-Prone Areas code*

This Directive from the Minister for Planning and Local Government had effect from 1 September 2017.

Directors Determination – Requirements for Building in Bushfire-Prone Areas (29 August 2017) contains *Deemed-to-Satisfy* (*DTS*) clauses for construction, access, water, hazard management areas and emergency plans. The construction and hazard management specifically apply to new buildings as well as alterations and additions to existing buildings. The *DTS* clauses for access and water only apply to new buildings – being silent on alterations and additions. To counter this the *Tasmanian Fire Service* (*TFS*) clarified (Bulleting No. 3, November 2018) that every bushfire assessment must record the extent of access and water supplies for fire-fighting and therefore needs to address the relevant *Performance Requirements* on these matters (or more).

11.1.2 Extent of building types requiring bushfire protections

The *Directors Determination* (2017) under the Building Regulations refers to buildings within a bushfire prone area of the following Class require bushfire protection:

Class 1: Residential

Class 2: Two or more dwellings

Class 3: Residential parts of other classes

Class 8: Factory or laboratory

Class 9: Health-care or public assembly building

Class 10a: Garage etc that is closer than 6 metres to a habitable building.

It excludes agricultural buildings which are not normally occupied. *Performance Requirements* may apply only to the residential Classes of use above (therefore specifically excluding class 8 and 9 uses).

Deemed-to-Satisfy requirements are met with reference to *AS 3959-2009* – for residential uses (Class 1, 2, 3, 10a building or deck). The *NASH Standard for Steel Framed Construction in Bushfire Areas* is permissible only to Class 1 dwelling and decking within Tasmania – thereby restricting its use.

11.1.3 Defining bushfire prone area

In Tasmania this means land mapped as bushfire prone on an overlay map, with 11 Councils having implemented the overlay by end of 2019 and the rest nearing completion (Bulletin 04, 06). Where there is no overlay map, land within 100 metres of bushfire prone vegetation of 1 hectare or more is deemed 'bushfire prone'. The vegetation definition means contiguous vegetation including grasses and shrubs but excluding managed and maintained land uses (ie. lawns, parks, gardens, golf courses …).

11.1.4 Land use standards

The *Directors Determination* (2017) sets out *Objectives* before outlining *Acceptable Solutions* and *Performance Criteria* all as risk factors to be addressed for:

- Vulnerable uses
- Hazardous uses

Typically, these involve justification that it is needed and there is no suitable alternative; there's an emergency management strategy in place; with a bushfire hazard management plan with appropriate protection measures certified by the TFS or accredited person.

11.1.5 Subdivision

The subdivision of land is subject to the *Bushfire-Prone Area Code* and is regulated through the planning system. The Code requires that a *Bushfire Hazard Management Plan* is provided that includes BAL ratings for all lots. The objectives provide for safe access/egress; access to the bushfire prone vegetation; access to water supplies; and are designed for connectivity with multiple evacuation points. Standards for roads, property access and fire trails are established, before further standards for reticulated and static water supplies. For new subdivisions, BAL-19 is required throughout – unless a Performance-based Solution is proposed - and accepted. This is a strong restriction on new subdivisions anywhere near designated vegetation.

11.1.5 *DTS* vs *Performance Solution*

Bushfire Hazard Advisory Note No. 6 (April 2018) spells out that on sites assessed at BAL-40 or BAL-FZ, only a *Performance Solution* will be considered (no *DTS* provisions) – and only where the increased exposure cannot reasonably be avoided and a tolerable risk outcome is demonstrated. This is a conscious departure and tightening of regulations from *Deemed-to-Satisfy* for BAL-40 within AS 3959. Involvement of the Tasmanian Fire Service in the early planning and design process is suggested.

The examples that the *TFS* provide where a *Performance Solution* may be considered are:

- Alterations or additions to an existing non-compliant building,
- Development on a site that otherwise cannot meet the BAL rating
- Eco-tourism development that relies on its location within an environmentally sensitive location.

The Note suggests that *DTS* provisions require enough separation between building and hazard for BAL-19 if on a lot created under the *Bushfire Prone Areas Code*, and BAL-29 if on a pre-existing lot. Hence there are no *DTS* provisions in Tasmania for BAL-40 or BAL-FZ. Explicitly, the TFS will not support BAL-40 or BAL-FZ outcomes without provision of a thorough and acceptable risk analysis by an accredited bushfire professional.

11.1.6 Alterations and additions

Where an addition or alteration is 20m^2 or less and is not closer to bushfire-prone vegetation, then there are no special bushfire requirements. Where an addition or alteration is >20m^2 and a building permit is required, then a *Hazard Management Area* dimensioned for the BAL-level of the additions or alterations, plus fire-fighting water supply and adequate property access is required. Hence provisions of AS 3959 will generally apply to the alteration or addition in accordance with the BAL-level.

11.1.7 *Bushfire Hazard Assessor* (*BFHA*) /*Bushfire Hazard Practitioner* (*BFP*)

Accreditation is required by the Chief Officer of the *Tasmanian Fire Service,* with 62 such persons state-wide at time of writing. Four categories of practitioners were established (with some sub-categories) that defines regulatory acceptance of their assessment capability. Tasmania has no full training courses of its own, relying on those from Melbourne (Uni of Melbourne) and Sydney (WSU, UTS). Completion of an approved course is required, and/or evidence of capability within the Tasmanian context. A year's mentoring is the norm, until full competency is demonstrated.

Bushfire prone area	Type of site assessment required	Prescribed person for assessment	Building design	Building surveyor	Other provisions
All	Bushfire hazard management plan (including bushfire hazard report and BAL assessment)	Bushfire hazard practitioner	Any licensed Building Designer/ Architect To take into account BAL assessment and hazard management plan	To take into account BAL assessment and hazard management plan	Deemed-to-satisfy provisions for design and construction, property access, water supply for firefighting, hazard management areas and emergency planning

Figure 11.1: Bushfire assessment requirments (Source: www.cbos.tas.gov.au/topics/technical-regulation/building-bushfire-prone-areas.pdf)

11.1.8 Bushfire Hazard Management Plan (BHMP)

The *BFHP* prepared by an accredited Assessor (after a *Bushfire Hazard Report* establishes the BAL rating) will document:

- The *Bushfire Attack Level* assessment (BAL) rating,
- Site information including required distance form bushfire-prone vegetation,
- Ongoing maintenance requirements (dwelling and property),
- Site access and water supplies in the event of a bushfire,
- Any additional measures to mitigate the bushfire hazard.

11.1.9 Hazard Management Area (HMA)

Hazard Management Areas is the area between a habitable building and bushfire prone vegetation. This is for fire-fighting access ('defendable space') plus enhances protection for buildings. It must be maintained in a low fuel condition with defined vegetation management and maintenance. Where this is on adjoining land, then a formal agreement is required in perpetuity, either as part of the planning permit approval or an easement or covenant under the land Titles Act 1980.

11.1.10 Private bushfire shelters

The 'Building for Bushfire' *Bulletin* (No. 1, March 2018) makes clear the *TFS* view that there is no conclusive evidence that such shelters are safe to use and able to be considered a reasonable alternative to stand-alone safety requirements. There is no acceptable *DTS* specification for private bushfire shelters. Hence Tasmania will only accept them as complying with the *NCC* with a *Performance Solution* that addresses the ABCB's *Performance Standard for Private Bushfire Shelters.*

11.1.11 Water supplies

To meet *DTS* requirements for fire-fighting water supplies, 10,000 litres dedicated water supply in a concrete or metal tank is required (excluding other uses including sprinkler systems). Specific distance requirements are set between the point of supply (with hard-stand to avoid emergency vehicles getting bogged) and hose access to the farthest part of any house. A 65mm Storz fitting is required for water connection by fire-fighting vehicles.

Where reticulated water supplies are available, the building to be protected must be within 120 metres of a fire hydrant.

11.4 TIMBER CONSIDERATIONS

There are no special requirements or limitations apparent upon timber usage, past the restrictions imposed by *AS 3959-2018* through the *BCA/NCC*.

11.5 TASMANIA SUMMARY

Tasmania has recently developed a comprehensive suite of regulatory and advisory requirements for bushfire prone developments. These are consistent and conservative in limiting subdivision to BAL -19 (or BAL-29 with acceptance of a Performance Solution) plus treating new buildings or alterations/additions past BAL 29 as being outside *Deemed-to-Satisfy* provisions. This is more restrictive than AS 3959 which allows BAL-40 development to be accepted as *DTS*.

Little is stated about re-development of existing buildings other than alterations or additions > $20m^2$ must comply with hazard management areas (low fuel defendable space) access and stored fire-fighting water. Regulatory bushfire safety expectations for non-residential Classes of building (Class 8 and 9) are not clear.

11.6 TERMINOLOGY

Terms specific to this state include:

Bushfire Hazard Report	Means a report by an accredited person that provides an assessment of the bushfire risk and includes hazard mitigation strategies and a bushfire hazard management plan.
Bushfire Hazard Management Plan (BHMP)	A plan which shows the building location plus dimensions of the *Hazard Management Area* as approved by TFS.
Bushfire prone vegetation	Contiguous vegetation including grasses and shrubs but not including maintained lawns, parks and gardens, nature strips, plant nurseries, golf courses, vineyards, orchards or vegetation on land that is used for horticultural purposes.
Emergency Plan	As defined in the *TFS Bushfire Emergency Planning Guidelines*
Fire-fighting water point	Where a fire appliance can connect to a water supply for fire-fighting purposes
Habitable building	Means a Class 1,2,3, 8 or 9 building as defined within the *National Construction Code.*
Hazard Management Area (HMA)	Means the area between a habitable building or building area and bushfire-prone vegetation which is to be maintained in a minimal fuel condition – defendable space around a building.
TFS Bushfire Emergency Planning Guidelines	Means the current version of the *TFS Bushfire Emergency Planning Guidelines.*
Tolerable risk	Means the lowest level of likely risk that can be managed by hazard management measures.
Vulnerable (land) uses	Education & occasional care, hospitals, residential respite/aged-care/retirement/group homes, custodial facilities.

From *Directors Determination …Building Act 2016*.

11.7 REFERENCES

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12 VICTORIA

Victoria has always had an extreme bushfire risk, with extensive dry eucalypt forest and grasslands, droughts, agricultural practices involving fire, plus large numbers of people living in bushfire prone areas, many in the rural/urban interface. Victoria's *Fire Danger Index* (*FDI*) within *AS 3959 – 2018* is 100 (excepting for alpine areas at *FDI 50*).

Bushfire risk management emerged around the Fire Brigades Act of 1890, that lead to formation of town and rural brigades. Following the disastrous 1939 Black Friday bushfire and subsequent Royal Commission (Stretton Inquiry), bushfire management and prevention were established. Following further bushfires in 1944, the *Country Fire Authority* (CFA) was established under a new Act. The *Ash Wednesday* fires (1983) spurred research into land-use planning with moves to designate bushfire prone areas and restrict living in the most vulnerable places. So from 1997 Victoria introduced the first bushfire-specific planning tool being the *Wildfire Management Overlay.* However, as was noted in the 2010 Royal Commission (that followed the 2009 fires), the *WMO* was inconsistent, didn't cover public land, was poorly mapped and was incorporated in less than half of Victoria's local planning schemes (Gonzalez-Mathiesen et al). The 2009 *Black Saturday* bushfires across Victoria were the worst ever recorded in terms of number of fires combined with fatalities.

The *Victorian Planning Provisions* (*VPP*) were amended in 2013 to replace the *WMO* with *Bushfire Management Overly* (*BMO*) plus clear bushfire objectives, standards and guidelines – including siting, protection, defendable space, water and access. Applications under the *BMO* had to be referred to the *CFA,* initially as the 'determining authority' and then the 'recommending' authority for local government. Meanwhile, *AS 3959* was updated from the 2009 version to 2018, and the all-steel NASH Standard was accepted as *Deemed to Satisfy*.

At present the Victorian CFA has around 35,000 volunteers and 1300 paid staff across 1220 stations, largely paid for by a fire service levy on property rates. The Victorian government is currently reforming management and governance of fire-fighting by mid-2020 through amalgamation of the *Metropolitan Fire Brigade* (predominantly Melbourne) with professional (paid) fire-fighters from the *CFA* (in larger rural towns) to become *Fire Rescue Victoria* (*FRV*). Controversially, this will leave the *CFA* as an entirely volunteer body.

12.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

Table 12.1: The relevant Victorian bushfire regulatory agencies.

AGENCIES with bushfire responsibilities	LEGISLATION & REGULATIONS
Emergency Management Victoria	***State Bushfire Plan 2014***
Metropolitan Fire Brigade ***Country Fire Authority (CFA)***	***Country Fire Authority Act 1958***
Department of Environment, Land, Water & Planning (DELWP)	***Planning and Environment Act 1987*** ***Victoria Planning Provisions***
Victorian Building Commission (VBC)	***Building Act 1993*** ***Building Regulations 2018***

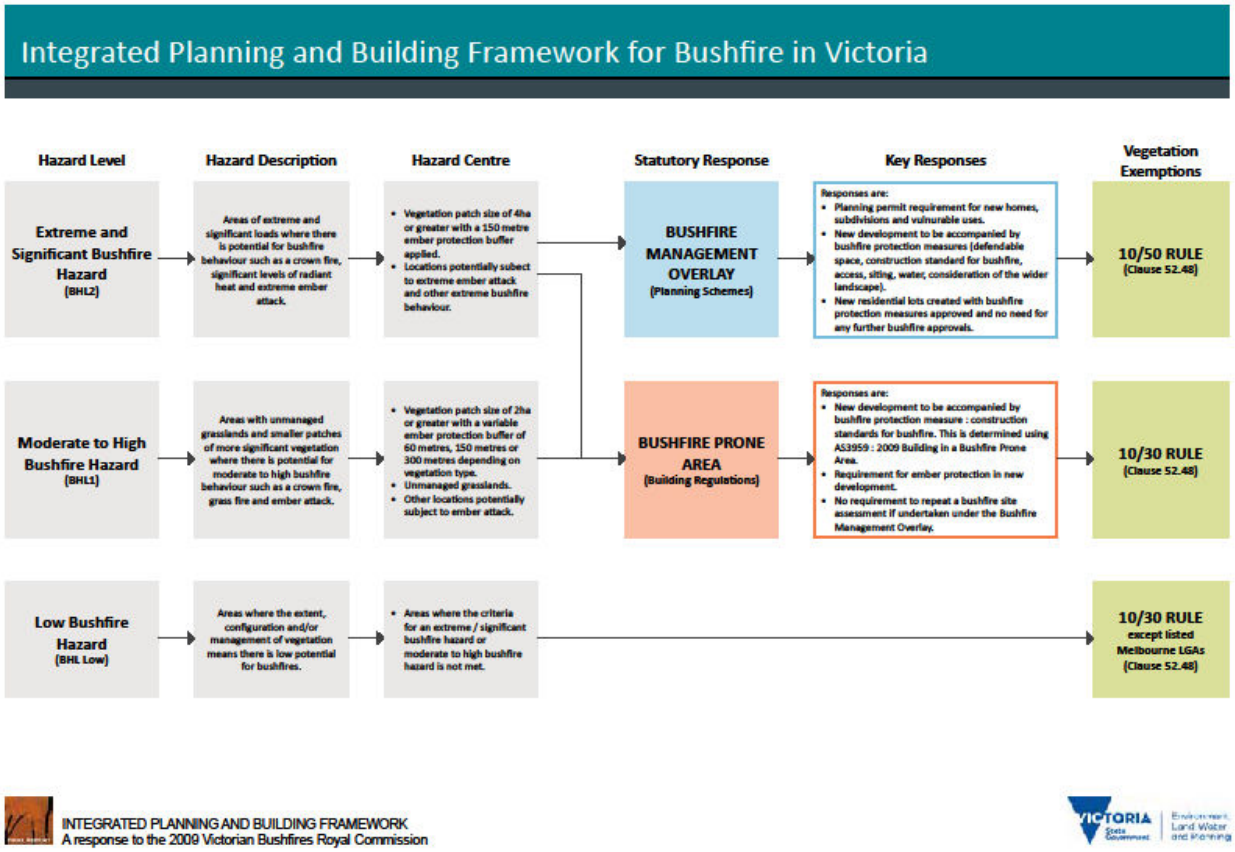

Figure 12.1: Victorian Integrated Planning & Building Framework (https://www.planning.vic.gov.au/policy-and-strategy/bushfire-protection/victorias-bushfire-planning-and-building-framework)

12.1.1 Country Fire Authority

This body has been the referral Authority for different types of applications where bushfire and fire authority requirements need to be considered in the statutory planning process. These include:

- Development and subdivisions located in the *Bushfire Management Overlay*
- Subdivisions where fire authority access and water supply need to be considered

CFA provides advice to councils whilst they remain responsible for liaising with building permit applicants. Ultimately the council is responsible for making the decision about permit applications and adherence to the CFA advice is not mandated.

12.1.2 Building Regulations

Australian Standard AS 3959-2018 – *Construction of buildings in bushfire-prone areas* applies to all new domestic buildings, alterations and additions in Victoria, including associated garages and sheds within a bushfire prone area.

Amendments to the *Building Regulations 2018* ensure that specific bushfire safety measures are applied to dwellings being rebuilt and located in a *Bushfire Management Overlay*. These amendments ensure that the building permit process requires the provision of dedicated on-site water supply for fire-fighting purposes, and access for emergency vehicles. The Regulations *Part 11 Bushfire Safety* requires that a building surveyor has to accept the BAL level within a planning scheme or a site assessment that is 'acceptable'.

12.2 LEGISLATIVE REQUIREMENTS (bushfire codes)

Victoria uses its mapped bushfire prone areas within its *Bushfire Management Overlay (BMO)* as the trigger for a planning permit to develop or subdivide land. Some Council areas have pre-determined BAL assessments. The mapping is available through Councils or VicPlan website (updated to 10 September 2019) which then requires a range of bushfire protection measures through several pathways that address requirements – summarised below.

12.2.1 *BMO* and single dwellings

The government has provided four options regarding building applications within *BMO* areas, with the Fast-track and Pathway 1 applicable to residential development:

Fast track Pathway (BMO Schedule): Some towns have pre-set bushfire protection measures to streamline application processes. These measures include a specified BAL for a new dwelling, defendable space around a dwelling, tree canopy clearance, water supply and fire-fighting access. Such applications do not then require an individual BAL assessment, but do need to submit a *Bushfire Management Plan*. A bushfire protection template/checklist is provided, along with a simple one-page 'Bushfire Management Plan' proforma for submission.

Pathway 1: Specified urban zones may be eligible for a further streamlined application that includes a *Bushfire Hazard Site Assessment*, a *Bushfire Hazard Statement* plus a *Bushfire Management Plan*. This may be in one document, long the lines of a proforma template provided. As above, it requires consideration and response to:

- **Siting:** Define the classified vegetation within 150 metres of the proposed development in accordance with *AS 3959* (2009).
- **Defendable space:** That includes grass is short with leaves and vegetation debris removed during the fire-danger period; no flammable objects with 10m; no vegetation within 3 metres of a window/glass; no shrubs under the tree canopy; trees not over-hanging and separated by > 5m; no low tree branches (2 m).
- **Building construction:** In accordance with the BAL level selected from the tables provided.
- **Water supply:** Related to Lot size. From 2,500L lot < 500m2; 5,000L for Lot size 500-1,000m^2; and 10,000 Litres static water supply reserved for fire-fighting for Lots over 1,000 m^2.
- **Vehicle access:** Defined requirements in terms of load limits, driveway/access length, turning circles, passing bays etc.

Outbuildings of less than 100m^2 area under the *BMO* do not require a Planning Permit through the *BMO* as requirements are pre-set. Over 100m^2, (where Planning Permits are required) associated with a dwelling (but not used for accommodation) may still be exempt from the *BMO* through pre-set bushfire conditions.

12.2.2 Most developments and the 'regular' Pathway 2

This is described as the **regular Pathway** that applies to:

- Single dwellings that do not meet the specified requirements in BMO schedule areas or urban zones.
- Single dwellings outside BMO scheduled areas or urban zones.
- Dependent person's units.
- Multi-unit development.
- Industry.
- Offices.
- Retail premises.

A planning application under the 'regular BMO process' requires the above considerations, plus a *Bushfire Landscape Assessment*. Again, a (lengthy, complex) proforma is provided to assist with a higher-level response required (that may include 'Alternative Measures' to *AS 3959*).

This pathway potentially includes bushfire compliance of all buildings to the *BCA/NCC* Classes except Class 9 (being public and assembly buildings).

12.2.3 *BMO* and subdivisions

Subdivisions become '**Pathway 3**' in the *BMO* process, as needing additional bushfire protection measures and referrals. Hence it requires all the above measures (see table above) plus:

- Response to landscape risk
- Siting
- Building design
- Defendable space
- Building construction
- Water supply
- Access
- Perimeter roads (if applicable)
- Management of landscaping and public open space

The *Bushfire Management Statement* and *Bushfire Management Plan* must show the approved or alternative bushfire protection measures, and that the measures have been met. The 'BMO Technical Guide' (2017) provides detailed illustrations of requirements and expectations on all such matters.

Application requirement	Fast Track Pathway (BMO Schedule)	Pathway One Clause 52.47-1	Pathway Two Clause 52.47-2	Pathway Three Clause 52.47-2.4
Bushfire hazard landscape assessment	✗	✗	✓	✓
Bushfire hazard site assessment	✗	✓	✓	✓
Bushfire management statement	✗	✓	✓	✓
Bushfire management plan	✓	✓	✓	✓

Figure 1: BMO application pathways (delwp, May 2017)

12.2.4 Residential alterations and extensions

Exempted from *BMO* requirements are alterations or extensions to an existing dwelling or 'dependent person's unit' that is less than 50 percent of the gross floor area of the existing building. Hence full compliance is required where adding 50% or more to the gross floor area. A building permit is not required where any alteration or addition is less than 10% of the floor area of the existing building.

12.2.5 Non-residential alterations & extensions

Here, all other building types and uses captured by *BMO* mapping that is less than 10% addition of gross floor space is exempt from a Planning Permit and mandated bushfire protection measures. Councils may still elect to refer the matter to the CFA and impose additional protection measures.

12.2.6 ***'Specific use bushfire protected buildings'***

Victoria, through its *Building Regulations 2018 Part 11,* inserted into the *BCA/NCC Volume 1 Schedule 3* has included new clauses to capture additional Classes of buildings for bushfire consideration – over and above the standard Class 1 to 3 requirements:

(a) **Class 9a or 9c** (ie. health care, aged care)
(b) **Class 9b** (ie. schools, early child-hood centre)
(c) **Class 4** (ie. a single residence when located in the three examples above)
(d) **Class 10a** (ie.a building or deck associated with (a) to (c) above.

12.3 FURTHER BUSHFIRE CONSIDERATIONS

12.3.1 Private bushfire shelters

'Bushfire bunkers' (Class 10c) are seen in Victoria (and elsewhere) to be an option of last resort as a bushfire refuge whilst the fire front passes. There are a limited number of pre-fabricated products on the market, plus an advisory ABCB Handbook in meeting construction standards for on-site construction (ABCB, 2014). The CFA advice is to leave early, rather than rely on onsite sheltering. Nevertheless, the *Victoria Planning Provisions* (Clause 53.02-3) permits a reduction of one BAL level if/when a private bushfire shelter is approved and installed to the ABCB guideline document.

Victoria's Building Regulation Advisory states that a Building Permit must be issued to establish the shelter has indeed addressed the ABCB performance criteria (necessitating a documented fire-engineering approach with certification by a fire safety engineer who did not design the shelter). Of note is that Victoria has broadened the acceptability of shelters from Class 1a (single dwelling) to 'Class 1' that includes boarding house, guest house hostel for up to 12 persons.

12.3.2 The 10/50 and 10/30 vegetation rule

Following the 2009 Victorian 'Black Saturday' bushfires, immediate effect was given to land-holders 'right' to remove native trees within 10 metres of a dwelling without a permit, plus removal of vegetation for 50 or 30 metres out from the dwelling. Fifty metres applied in areas covered by the *BMO*, whilst 30 metres applied to all Victorian properties other than metropolitan – but only for properties built or approved before 10 September 2009. Following that date, vegetation and removal requirements or rights depends upon planning (*BMO* - 10/50) or building permits (10/30).

12.3 TIMBER CONSIDERATIONS

There are no special requirements or limitations apparent upon timber usage, past the restrictions imposed by *AS 3959-2018*.

12.4 VICTORIAN SUMMARY

Victoria has suffered the worst recorded bushfire fatalities in Australia and since the *2009 Victorian Bushfires Royal Commission* has progressed the bushfire awareness and safety agenda through both planning and building edicts. In the designated bushfire prone areas the *Bushfire Management Overlay* applies to nearly the full range of building uses and Classes, with specific requirments for bushfire site assessments, bushfire landscape assessments plus bushfire management statement. Key objectives are landscape siting and design, defendable space, water supply and vehicular access, plus vegetation management. Noteworthy is that private bushfire shelters are also applicable to Class 1b accommodation for up to 12 persons – past just Class 1a dwellings – uniquely for Australia.

12.5 TERMINOLOGY

Terms specific to this state include:

Bushfire Management Overlay (BMO)	Bushfire Management Overlay (BMO) as defined in the Victoria Planning Provisions (Clause 44.06).
Bushfire Management Statement (BMS)	A bushfire management statement (BMS) must be prepared in accordance with Clause 44.06 of the planning scheme to demonstrate the way the application meets the relevant requirements of the scheme (i.e. it is an assessment of the application).
Bushfire Management Plan (BMP)	A bushfire management plan (BMP) is a document that sets out how the applicant intends to implement the bushfire mitigation measures. It will usually include a plan and a schedule.
Classified Vegetation	The vegetation that presents a bushfire hazard within 150 metres of the development and is classified in accordance with Section 2.2.3 of AS 3959.
Excludable Vegetation	Vegetation that does not need to be classified as part of the bushfire site assessment. It may include 'low threat' and 'non-vegetated' areas as defined by Section 2.2.3.2 of AS 3959.

12.6 REFERENCES

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12.7 ACKNOWLEDGEMENTS

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13 WESTERN AUSTRALIA

The state of WA is one-third of Australia's land mass, mostly an ancient now hot and dry uplifted plateau, except for the south-western corner where there is water, forests, and most of the state's population. Climatically, the Kimberly in the north has a tropical hot monsoonal climate with up to 1500mm rainfall in the wet season. The savanna and desert regions are dry, receiving only an erratic 200 – 250mm rainfall per annum. In contrast the temperate south-west corner is more fertile and forested, with greater bushfire hazard and risk, even though vast wildfires spread through the more northern inland savanna. As a consequence, there is no 'bushfire season' in WA. And the state-wide FDI is 80 (to AS 3959).

Construction standards in WA was formerly considered a matter for the *BCA/NCC* regulation only through the 1990's, including earlier versions of *AS 3959* – meaning bushfire controls were almost entirely 'construction' matters. In 2001 the Fire & Emergency Services Authority (FESA) and the WA Planning Commission (WAPC) published *Planning for Bushfire Protection Guidelines.* Responsibility for the designation of bushfire prone areas rested with local government, with apparently little uptake. Following the 2011 Perth Hills bushfires, a bushfire planning and building review (2015) was undertaken that established the important role of land-use planning and building for bushfire risk, plus better preparedness. Hence planning for bushfire protection has only been mandated since 2015, with local government having a significant decision-making role – more so than referral to state agencies. The *Fire & Emergency Services* Commissioner was given the role of determining bushfire prone areas across the state.

Table 13.1: The relevant WA bushfire regulatory agencies.

AGENCIES involved with bushfire issues	LEGISLATION & REGULATIONS regarding bushfire
WA Planning Commission (WAPC)	***Bushfire Act 1954*** and ***Fire & Emergency Management Act 2005 -*** *are being rewritten as*
Department of Planning, Lands and Heritage	***Consolidated Emergency services Act 2020(?)***
Department of Fire & Emergency Services (DFES)	***Planning and Development Act 2005***
Office of Bushfire Risk Management	***Planning and Development (Local Planning Schemes) Regulations 2015*** (LPS Amendment Regulation)
Building Commission	***Building Act 2011***

13.1 PLANNING & BUILDING REGULATORY FRAMEWORK – bushfire requirements

The *Local Planning Scheme Regulations* (December 2015) introduced an exemption of bushfire controls for residential lots (< 1100 m^2) or other specified buildings within a designated bushfire prone area ("reducing red tape"). However habitable buildings of all types when sited on *BAL-40* or *BAL-FZ* sites required Development Approval. This relied upon 'BAL Contour Maps' as part of subdivision approval and if not satisfactory, then a BAL Assessment had to be made. The *Planning Policy 3.7* plus the G*uidelines for Planning in Bushfire Prone Areas then applied.*

Concerns were raised about the adequacy of the vegetation mapping and bushfire hazard mapping, plus the implementation of these policies. This led to a 2019 review - *Bushfire Planning and Policy Review: A Review into the Western Australian Framework for Planning and Development in Bushfire Prone Areas (Dr Tony Buti). The WA government then committed to a three-stage set of reforms now underway - to be fully implemented by late 2020.*

13.1.1 Bushfire Framework Review 2019

The review 'Action Plan' (Buti, 2019) has led to commissioning a new and improved (CSIRO) identification of bushfire prone areas; streamlined planning approvals for lower-risk (metropolitan) areas; and new bushfire policy yet to be written/established – in three stages:

- **Stage 1:** Revised the map of Perth metropolitan sub-region to remove small parcels of isolated vegetation from bushfire consideration. The mapping standard more generally is revised to lower the risk from vegetation within built-up areas. These changes have now taken effect.

- **Stage 2:** Revise the vegetation mapping for all of WA in association with the CSIRO, by late 2020.

- **Stage 3:** Amend the states bushfire policy and regulatory framework in response to the new mapping, by late 2020.

Nevertheless, the standard broad vegetation classifications from AS 3959 currently apply.

13.1.2 *State Planning Policy 3.7* (*SPP3.7*)

This SPP (from 7 December 2015) has a policy intent of introducing effective risk-based land-use planning to WA. The Policy contains higher-order objectives plus the measures that then apply. This then established the requirement for BAL assessments to AS 3959 to be undertaken by an accredited Level 1 Bushfire Assessor, or an accredited *Bushfire Planning Practitioner* (levels 2 and 3). *BAL Contour Maps* are required for new subdivisions within bushfire prone areas, after which that BAL assessment is accepted at construction stage. Where there is no BAL Contour map, individual BAL assessments are required. The exception being single house and ancillary dwellings (ie. granny flat) on lots equal or greater than 1100m^2 – being exempt for individual BAL-rating.

Local Planning Schemes (LPS) are required to provide the mapping and require compliance with the relevant BAL-rating construction standards in accordance with AS 3959. Several 'Fact Sheets' state that Development Applications in areas of BAL-40 and BAL-FZ "..will not be supported in most instances" be that large-lot residential (over 1100 m^2), high-risk land uses (service stations, bulk storage/hazardous materials, heavy industry, sawmills etc) plus vulnerable land uses (ie. schools, hospitals, tourism) which may have additional requirements. In such instances the Bushfire Management Plan must be endorsed by Local Government and the *Department of Fire & Emergency Services*. An Emergency Evacuation Plan may also be required and the services of a suitably qualified fire engineer is suggested.

The WA *Guidelines for Planning in Bushfire prone Areas* (December 2017) defines the roles and bushfire responsibilities between all agencies and levels of government in Section 6. There is still a separation between assessment of bushfire planning with bushfire construction, with only 'high-risk' uses, *AS 3959 Method 2*, or local government referrals being assessed (as 'recommendations' - rather than mandated) by the *Department of Fire & Emergency Services*.

13.1.3 Extent of building types requiring bushfire protection measures

The *Directors Determination* (2017) under the Building Regulations refers to buildings within a designated bushfire prone area of the following Class:

- **Class 1:** Residential, including dwellings, attached residential buildings, boarding houses, guest house, hostel, some holiday accommodation.
- **Class 2:** A building with two or more separate dwellings ('sole occupancy units').
- **Class 3:** Other residential buildings including residential parts of a hotel, motel, school, aged accommodation, children /people with disabilities, residential part of health care, detention centre.
- **Class 10a** that is closer than 6 metres to a habitable building.

Non-habitable sheds not associated with a dwelling do not require planning approval or Asset Protection Zone. The builder or entity that signs the building permit is responsible for ensuring that the building conforms to the bushfire construction requirments where a BAL-rating is required. Local government has the statutory power to enforce requirements.

13.1.4 Defining bushfire prone area

The bushfire prone mapping from 2015 prepared by the *Office of Bushfire Risk Management* within *DFES* identifies the presence of bushfire prone vegetation (based on AS 3959 methodology) plus a 100 metre buffer. A recent paper (Rowe, 2019) suggests that each local government area is required to address the hazard mapping issues within their own boundaries (which isn't always complied with).

13.1.5 Land use standards

Land use intensification in bushfire prone areas that increases a greater number of persons to a bushfire is "strongly discouraged" (Guidelines, p27). Similarly, separation from the bushfire hazard for BAL-40 and BAL-FZ developments is required.

13.1.6 Subdivision

If the property is within a designated and mapped bushfire prone area, then a *BAL Contour Map* must be prepared by an accredited Bushfire Planning Practitioner, before applying for subdivision to *WPAC*. A Bushfire Management Plan is also be required where any lot is determined as BAL-12.5 or greater. Generally, any lots proposed with BAl-40 or BAL-FZ will not be considered appropriate for approval. The stated exception to this is a 1 into 2 lot subdivision, where a BAL assessment for each can prove the proposal to be acceptable.

13.1.7 *DTS* vs *Performance Solution*

Deemed to Satisfy solutions must conform to AS 3959 in WA. Evidence-based performance-based bushfire management solutions are required to demonstrate compliance with all the performance principles of the *State Planning Policy 3.7*, with verification acceptable to DFES.

13.1.8 Alterations and additions

The WA *LPS Amendment Regulation 2015* specifically exempt alterations, extensions and additions from requiring planning approval.

13.1.9 All other buildings (Class 4 to Class 9)

In WA the planning approval process for these building types are expected to apply bushfire protection criteria – without any specific regulatory requirement – mentioning appropriate siting, water tanks, passing bays. The applicant is given discretion to utilise any/all of the AS 3959 provisions.

13.1.10 Private bushfire shelters

As non-habitable Class 10c structures, the *BCA/NCC* requires it meets performance requirements, and be approvable through a building permit in WA.

13.2 ASSESSMENT & GUIDELINES

13.2.1 *Bushfire Hazard Assessor* (*BFHA*) /*Bushfire Hazard Practitioner* (*BFP*)

The paper by Rowe (2019) highlights the 2018 WA *Government Regulatory Impact Statement* show low levels of bushfire compliance (38%) with buildings not constructed in accordance with bushfire assessments – which in turn were not always following established methodology. It highlighted there was no independent inspections of completed buildings for compliance. Only recently has WA accepted that BPAD-trained (and

insured) Assessors under the *Fire Protection Association of Australia* (FPAA) should be the professionals making the BAL assessments and more (Wyborn, 2019). An exception is offered for a single house and/or ancillary development more than 50 km from the boundary of a gazetted town site, wherein the local government decision-maker must be satisfied that the BAL assessment is appropriate. Nevertheless, most local government will still generally accept BAL assessments from anyone.

13.2.2 *Bushfire Hazard Level* assessment (*BHL*)

This process is described as a 'broad-brush' bushfire assessment used for pre-development decision-making tool to inform the suitability of future subdivision and development – intensification of land use. The assessment methodology categorizes the hazard level as low, moderate or extreme, to be mapped by an accredited Assessor for the subject site plus 150 metres out. Classified vegetation is as per AS 3959, and is to follow the low/moderate/extreme classification plus be mapped as an aerial photo overlay.

13.2.3 Bushfire protection criteria

The WA 'Guidelines' (Appendix 4) sets out four 'Elements' and then performance Principles, Acceptable Solutions and 'explanations' under the following headings.

Table 13.2: Elements in the WA Guidelines

ELEMENT 1: LOCATION

ELEMENT 2: SITING and DESIGN of DEVELOPMENT

- Asset Protection Zone
- Subdivision and development design
- Schedule 1: Standards for APZ's

ELEMENT 3: VEHICULAR ACCESS

- Two access routes
- Public roads
- Cul-de-sac
- Battle-axe
- Private driveway longer than 50 metres
- Emergency access way
- Fire service access routes (perimeter roads)
- Firebreak width

ELEMENT 4: WATER

- Reticulated areas
- Non-reticulated areas
- Individual lots within non-reticulated areas

13.3 TIMBER CONSIDERATIONS

Apart from a few WA Councils/Shires, there are no special requirements or limitations upon timber usage externally in bushfire prone areas, past restrictions imposed by *AS 3959-2018*. It should be noted that WA home construction tends primarily to be brick with concrete slab on ground.

13.4 WA SUMMARY

The bushfire regulations are currently in flux, with greater emphasis to be placed on upgraded local bushfire mapping, broader landscape assessment, greater emphasis on developing *Bushfire Planning Practitioner* assessments, and clarify decision-making and referral processes between the several regulatory authorities (planning, construction, bushfire agencies).

Of note is the exemption from bushfire regulations generally on all residential properties on lots < 1100 m^2 plus alteration and additions – where advice is proffered rather than mandated. Whilst there are no bushfire requirements for building types/uses (Class 4 – 9) consistent with *BCA/NCC* requirements, there are concerns expressed about bushfire protection measures for 'vulnerable persons' without providing guidelines or regulations other than for the limited 'Elements' above. Hence we suggest it is fair to say that the WA bushfire building regulations are currently quite loose, compared to other jurisdictions.

13.5 TERMINOLOGY

Terms specific to this state include:

BAL Contour Map	Scale map of lots with potential radian heat impacts giving indicative BAL ratings.
Bushfire Hazard Level (BHA) assessment	A measure of the likely intensity of a bushfire on a site by categorising the land as low, moderate or extreme BHL is accordance with 'Guidelines ..' December 2017.
Bushfire Management Plan (BMP)	A document that sets out short, medium and long-term risk management strategies for the life of a development in accordance with the 'Guidelines ..' December 2017.
Bushfire Planning Practitioner (BFPP)	A person who holds Level 2 or 3 accreditation under the WA Bushfire Accreditation Framework.
Fire-fighting water point	
Guidelines	Refers to the *Guidelines for Planning in Bushfire Prone Areas* as amended.
High-risk land use	A land-use that may lead to the potential ignition, prolonged duration and/or an increase in intensity of a bushfire.
Unavoidable development	Development that represents exceptional circumstances where full compliance with the policy would be unreasonable, no alternative location exists, it is not minor development, and it is not contrary to the public interest. Examples include state infrastructure, emergency services, historical/cultural sites.
Vulnerable land uses	Education & occasional care, hospitals, residential respite/aged-care/retirement/group homes, custodial facilities.

From *Directors Determination …Building Act 2016*.

13.6 REFERENCES

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- *Residential or accommodation buildings (other than a house,* April 2016.
- *Developing mixed-use, commercial, industrial buildings or public facilities (Class 4 to 9 buildings).* April 2016.
- *Subdividing a property,* December 2015.

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Wyborn, C. (24 October 2019) ***Harmonising the Regulatory Framework (NCC 2019, AS 3959, PBP 2019, BVM)***. Paper at 2019 BMEE Australian Bushfire Building Conference, Leura.

13.7 ACKNOWLEDGEMENTS

Jackson Parker, *Department of Fire & Emergency Services*, Director, Bushfire Technical Services.

14 CONCLUSION + timber restrictions

Timber is publically regarded as 'suspect' in bushfire prone areas for many applications – without real understanding or reference to test evidence to the contrary. The too common belief is that as timber is combustible, it's just not suitable for external use within a bushfire prone area. This same ethos and misunderstanding flows through to policy makers and bushfire building regulations – although this is generally limited to reference to *AS 3959-2018* Table F1 '*Bushfire-Resistant Species*'.

14.1 Timber usage generally

The c.2001 fire test research reported in *National Timber Development Council* Bulletin No.1 2000 (Amended May 2004) by Warrington Fire Research on *'The suitability of the use of various untreated timbers for building constructions in bushfire-prone areas'* appears to have had no regulatory impact. That opinion, based on testing to the then *AS/NZS 3837:1998*, found that most Australian hardwoods of a higher density could be considered suitable for external use in bushfire prone areas. Presumably this leads to the Appendix E species listing within *AS 3959*, both in the 2009 version and the current 2018 edition.

External use of timber within bushfire prone areas: currently, there appears to be no use or differentiation of the two Tables (E1, E2) within Appendix E of *AS 3959-2018* related to density/weight.

AS 3959-2018 Appendix F 'Bushfire-Resisting Timber' of six native hardwood species (plus imported rainforest species Kwila/Merbau) has been invoked as the default hardwood species for use up to BAL-29 (backed by the *BCA/NCC* construction requirements).

Internal use of timber within bushfire prone areas: All kinds of timber and timber products are available and suitable for internal use – as bushfire building regulations are concerned exclusively with the external materials and building fabric.

14.2 NSW regulatory restrictions on timber in bushfire prone areas

NSW through the Rural Fire Service appears to be the only jurisdiction that has imposed external timber restrictions past that within *AS 3959-2018* and the standard fire testing regimes of the *AS 1530.8* series:

- *AS 1530.8.1* for BAL-40,
- *AS 1530.8.2* for BAL-FZ (Flame Zone)

The RFS '*Fact Sheet 2/17*' of June 2017 'Combustible Construction in Bush-Fire Prone Areas' discusses 'flaming' and suggests that timber window frames that meet the above fire tests "..may be considered inconsequential trim contingent on consultation and approval by the NSW RFS." The same document is silent on timber doors – leaving great uncertainty….

14.3 The future of bushfire building regulations

The spring/summer mega-bushfires of 2019/2020 across Australia has spurred three Inquiries with remits that include a close re-examination of bushfire building regulations. Changes are currently afoot, even since the start of 2020. More will occur in the course of this year – so this report needs to be considered as regulatory 'snapshot' at the end of 2019.